EdTech updated

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Massachusetts Department of Education

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From the Commissioner

Letter

Dear Educator:

This summer, I attended a conference in Los Angeles sponsored by the Milken Family Education Foundation. At that annual conference, award-winning teachers and principals from across America were brought together for a series of workshops and ceremonies. The conference had a profound impact on the way I think about educational technology.

As Deputy Commissioner of Education, I work closely with Greg Nadeau, Connie Louie and the rest of the staff who make up the Department's EdTech Group. While I have always been impressed with the quality of their work, the Milken conference confirmed that what this Department and State are doing has national significance.

To amplify and update the basic message from last year's EdTech Update:

Technology ***WILL*** provide improved learning opportunities for students.

Technology ***IS*** providing powerful new tools to enhance the professional capabilities of teachers.

Technology ***IS*** increasing the efficiency and effectiveness of our administrative systems.

The emphasis is added to make clear where we, as a State, stand today. We know by experience how much technology can improve teacher professionalism and the administrative efficiency of schools and districts, and our efforts have focused on those two areas. Proving how technology improves learning is more difficult. However, significant evidence is mounting. A recent Milken Foundation study (summarized in this report) is among the first national studies to provide quantitative evidence of what we've long suspected. Having made significant headway with the second two goals, we are just beginning to undertake the more difficult task of discovering ways in which technology can measurably improve learning. To be clear, the quality of instructional technology is extremely varied. While our Lighthouse Sites provide examples of effective technology use, there are at least as many classrooms in which computers are underutilized or even misused.

Despite our enthusiasm about technology and learning outcomes, we also know that computers are not a panacea. As with other teaching innovations, the key to improving student learning is always the quality of the teacher. Teachers have to learn how to use technology effectively before they can integrate it into their work.

Mass State EdTech Plan FY'99 Objectives

This fall, over $20 million of new grants will go out to schools to assist them in providing technology training and professional development. These grants, in concert with the $75 per pupil of state aid for professional development, should guarantee every educator in the state access to training opportunities.

Over the last two years, the Department's annual technology spending has grown from $3m to $40m. Like all of you, we are grappling with determining appropriate spending levels, attracting talented people, and using technology to improve our work. These challenges have underscored our need for effective planning, which has become a central role for my office. This document constitutes the formal, mandated, update to the Massachusetts Statewide Educational Technology Plan. We will submit it to the U.S. Department of Education on behalf of the Commonwealth.

Like the Department of Education, every district will be required to update its own technology plan. Districts will also complete an on-line survey this spring to remain eligible for the grants we administer.

Finally, all of these articles, and additional information, will be available through a redesigned web site at www.doe.mass.edu/edtech. I wish you the best of luck with your 1998-99 technology implementation efforts and pledge the continued support and leadership of the Department and our staff.

David P. Driscoll
Commissioner of Education

(1) Move IMS into full production on time and on budget.
(2) Engage 85% of teachers in technology training and 50% in professional development.
(3) Engage 25% of teachers in on-line content.
(4) Launch Mass Community Network.
(5) Develop student and teacher technology guidelines.

Executive Summary

The Department's educational technology initiatives are organized into three categories: improving learning opportunities for students, providing new tools to enhance the professional capabilities of teachers, and increasing the efficiency and effectiveness of our administrative systems. Everything we do is undertaken with one or more of those efforts in mind. Thus, to improve learning opportunities for students, we are giving grant money to districts for technology (Projects with Statewide Impact Grant); we are funding and promoting innovative classroom practices that use technology (Lighthouse Sites); and we are promoting students as technology leaders (Youth Tech Entrepreneurs). To provide powerful new tools to teachers we created a super low-cost Internet service (MassEd.Net); we won a $10 million grant to create a statewide collaborative of nationally recognized organizations providing technology professional development (Project MEET); we are beginning work on an on-line database of curriculum resources and a district-based curriculum alignment application (Curriculum Library Alignment and Sharing Program); and we created a grant to integrate instructional technology into teacher preparation programs (Instructional Technology Preservice Grants), as well as grants to support model professional development projects and adopt best technology practices. To increase the efficiency of our administrative systems we are undertaking a massive overhaul of our data collection, transmission and reporting systems (Information Management System); we are changing the way schools buy technology by creating a procurement system tailored to needs of K-12 (Educational Technology Integration Service); and we are beginning a plan to build a statewide dedicated network connected to MITI (Mass Community Network). Finally, we are promoting the effectiveness of appropriate educational technology in schools wherever and whenever we can, and so we have included a copy of the press release on the recently published Milken Report. □

The Massachusetts State of EdTech Index

1996 student computer state ranking,	**48th**
1998 student computer state ranking,	**21st**
Student to [modern] computer ratio, 1998,	**10.6 to 1**
National Student to [modern] computer goal,	**6 to 1**
Percent of classrooms on-line, 1997,	**25**
Percent of classrooms on-line, 1998,	**51**
Grade span with the most classrooms on-line,	**K-5**
Grade span with the best student/computer ratio,	**9-12**
Total spending in millions on EdTech, FY'94,	**$30**
Total spending in millions on EdTech, FY'97,	**$157**
State EdTech grants in millions, FY'94-FY'96,	**$2.5**
State EdTech grants in millions, FY'97-FY'99,	**$45.0**
Collection cycle - state of EdTech data w/o IMS,	**14 months**
Collection cycle - state of EdTech data with IMS,	**48 hours**

The best way to predict the FUTURE is to INVENT IT

-ALAN KAY

Educational Technology

Q & A

Questions from the February, 1999 issue of School Business Affairs, the professional journal of the Association of School Business Officials International. Answers provided by Greg Nadeau, Chief Technology Officer [cto@doe.mass.edu], and Connie Louie, Project Director, Instructional Technology [clonie@doe.mass.edu].

1. Given the rapid change in technology is "technology planning" possible, or is "technology planning" wishful thinking at best or a wasted effort?

GREG: The rapid change in technology makes planning even more essential. The difference is that planning must be a dynamic, rather than static, activity. There is not much of a point in developing a long-term "plan" that sits on the shelf. Technology implementation requires a formalized process of ongoing documentation and communication to keep people aligned.

As the Department's Chief Technology Officer, I maintain a comprehensive document that outlines our implementation plans for over $15 million in annual technology projects and over $20 million in annual grants. I update this document in virtually every meeting I have with my staff and provide it regularly to the Commissioner.

CONNIE: Since technology is ever-changing, more time and resources are needed to plan and implement technology in schools. Areas for planning include:

- Needs Assessment
- Network Planning and Design
- Hardware Acquisition
- Software Preview and Evaluation
- Procurement Assistance
- Professional Development
- Administrative Use
- Instructional and Curriculum Use

Technology planning is never done; it should be ongoing with constant revision to meet the changes in technologies and resources.

2. From your perspective, what are the biggest challenges schools face when planning for instructional or administrative technology?

GREG: Inadequate staffing. What most people don't understand is that technology is more about human resources than it is about hardware and software. This problem is exacerbated when technology is funded as a one-time capital item rather than as part of the operational budget. As a general rule, spending on "warm-ware" (i.e. staff and contracted services) should be three times greater than on hardware and software.

To make matters worse, schools will probably never be able to afford adequate staffing. While corporations have entire IT departments, many schools must frequently survive with only a single part-time professional. The current level of IT staffing is hopelessly inadequate.

The only solution, I am convinced, is to use students as a resource and train them to assist in network administration and user-support. We are starting a pilot program with Malden High School called Youth Tech Entrepreneurs to develop student-centered technology support. Some of these students will join us at the Department to help support our IT environment. Ultimately, if this proves to be successful, every district in the state can benefit from a similar program.

...technology is more about human resources than it is about hardware and software...

CONNIE: Schools face a variety of challenges. One challenge is *staying current* with rapid changes in technology; there are always new skills to learn. Another challenge is *overcoming fear* of technology; some teachers are tentative in their adoption of technology and they may feel less comfortable with technology than many of their students. The *maintenance of technology* poses another challenge; schools often lack sufficient personnel to adequately maintain and administer their networks. Another challenge is the true *integration of technology* with the educational process; the conversation of how, when and where technology can authentically make a difference has not really advanced.

3. How you do ensure that today's "top-of-the-line" computer hardware is not obsolete in 6 months?

GREG: Desktop personal computers last four years, laptops less. Schools need to plan on replacing 25% of their computers every year if they want their equipment to stay current.

The explosive use of the Internet has accelerated the replacement cycle for technology. It is increasingly important for users and organizations to upgrade hardware and software to stay current with changes in communication standards and more powerful applications.

CONNIE: With the rapid change of technology there is no guarantee that today's "top-of-the-line" computer hardware is not obsolete in six months. However, not ALL tasks need "top-of-the-line" computers. Schools need to plan and budget for the frequent replacement of some equipment and the maintenance of other systems.

4. Wiring schools and connecting to the Internet has been a top priority for educators in the past few years. When you look into your technology crystal ball, what are the big priorities you see in two years and in five years, and how will schools change as a result?

GREG: This year we are focusing on professional development. Last year it was networking. The year before it was comprehensive planning.

As I said earlier, staffing is the last of the major infrastructure pieces that schools are struggling to put into place. That will take another couple of years for the early innovators and longer for the rest.

Once a school reaches a sustainable level of ongoing support for hardware, networking, training, and staffing, things are really going to start happening in our schools. Teachers will begin exploring the full potential of information technology tools and provide students with powerful new learning opportunities.

In five years, this early stage of instructional technology will be widespread. Teachers will download lesson plans and assessment items linked to state performance standards for the majority of their curriculum material. Students in classrooms and at home will download assignments and submit their materials on-line to teachers and other people who will assess their work against the state standards. Everything that can be, will be measured, quantified, and stored in the student's electronic portfolio. In effect, every student, not just SPED students, will have an Individualized Education Plan.

CONNIE: As I stated earlier in the answer to question number two—training and professional development, maintenance and upkeep of the technology, and integration of technology into the education system are the priorities for the next 5 years.

If the world became a perfect place and schools' priorities were met, we would see teachers and students using the technology more prudently. Technology will never *replace* human interactions, but technology can *facilitate* interaction.

5. In your opinion what are the key components and objectives of a good short and long-range technology plan?

GREG: Start with vision. How will the school look five years from now and one year from now? How will the technology be used? If there is no vision, bring in someone new to the planning process.

Once the vision is established, work backwards to mark the major milestones with increased specificity as the date approaches. Then focus on short-term deliverables that fit into the milestones. Make sure the deliverables are very concrete so there is no misunderstanding the expectations.

Finally, share the plan with as many stakeholders as possible and revise it constantly to keep it up to date. Use the plan as a communication document for people directly and indirectly involved.

CONNIE: Setting up short-range and long-range goals is a good way of developing a plan. Then plan the short-range activities and long-range activities with a timeline to see that the objectives and goals will be met. The important thing is not to be afraid to revise the steps as you implement and evaluate the activities.

6. How can vendors help schools plan for technology changes, particularly with respect to controlling costs?

GREG: By not charging outrageous overhead on goods and services! We have created a Chapter 30B-approved vendor pool called Educational Technology Integration Services (ETIS) to ensure that vendors fully disclose actual costs of delivering services and justify the overhead they charge. Through this process, we have seen vendor overhead cut in half.

CONNIE: Vendors can help schools by listening to the needs of the schools and being sincere. Of course, vendors need to make some profit and schools will provide them with that if they meet their needs. Take, for example, a situation in which a school is setting up a network system and is not sure how many routers to put in—the vendor has the obligation to help the school to figure it out without overcharging or over-recommending. In the long run, if there is lasting trust between the schools and the vendors, better products and better service will be provided.

7. How have your views about administrative or instructional technology use in schools changed in the last two years?

GREG: In the last two years, the World Wide Web has become the only game in town. Now everything that we do is based on the web browser. All applications that we are building for administrative and instructional use will utilize the web.

The Department's Information Management System has shown that we can drastically reduce the collection and reporting cycle of the typical survey or report. We have begun building a web-based application to register every student into a statewide database to track MCAS results across time. This will replace the current summary surveys on students and will be the main source of data for school and district evaluations.

For teachers, we are building an on-line database of lesson plans indexed by the learning standards of the curriculum frameworks. Once again, we are using the power of the web to provide universal access to information.

CONNIE: With networking and the explosion of the Internet, there is no turning back to the traditional way of doing things in schools. The barriers for using technology in schools are starting to be recognized. Technology is still being used in traditional ways. There needs to be a fundamental change in the educational structure so that we can use technology to its fullest. For example, it will be great if the MCAS can be administered electronically, on-demand, at certain periods during the year. This may alleviate many schools' scheduling problems.

8. Please share your own technology goals for the next two years.

GREG: In addition to completing the Department's Information Management System and continuing to grow MassEd.Net, ETIS, Youth Tech Entrepreneurs, Lighthouse Technology Sites, and other successful programs, we will be launching a new project called "Mass Community Network" which will be an order of magnitude bigger than anything that we have done before.

Over the next two years we will build a super high-speed network that will connect all 3000 schools, libraries, and other public offices to each other and the Internet for a fraction of the market cost. Over the next 20 years, this network could save the Commonwealth as much as $1 billion. We will use these savings to leverage the development of a host of new on-line services for schools that will put Massachusetts at the forefront of the nation.

CONNIE: Massachusetts has just received a five year, $10 million technology professional development grant from the Technology Innovation Challenge Grant Program under the U.S. Department of Education. The goal of Project MEET, Massachusetts Empowering Educators with Technology, is to work with other state initiatives to bring 85% of Massachusetts teachers professional development opportunities and help 50% of the teachers to integrate technology into their classrooms. I am the Project Director of this project and I will work with all the partners to fulfill this goal.

9. Where would you go to find out about future trends in technology for schools?

GREG: First, I would talk to my wife, a 7th grade humanities teacher at Watertown Middle School. Although I have never taught, the daily conversations that she and I have about the impact of technology on schools gives me a basic context of what is possible in schools.

Second, I would go to my staff. In order to implement all of the Department's new technology initiatives, we have pulled together a top-notch group of people who understand the breadth and depth of technology-related issues.

Third, I would go to the field. Connie Louie and I run a monthly ET Advisory meeting that is open to everyone. Through that meeting and other conversations I have with educators, I have access to some of the best educational technology thinkers in the nation.

CONNIE: I go to the following resources:

- The research centers in Massachusetts (MIT Media Lab, Harvard Graduate School of Education, TERC, EDC, the Regional Lab, etc.) and other centers across the country
- My colleagues in other states - many of them share their experiences with me
- The educators in Massachusetts. Because I am administering all the technology grants of the state, I have the opportunity to meet a lot of very innovative teachers who are making a difference in the classroom using technology. These educators are the trendsetters for other teachers. The Lighthouse Site Program is a good example of how teachers learn from each other
- Finally, I visit different education web sites

Greg Nadeau has served as the Chief Technology Officer of the Massachusetts Department of Education for two years. Prior to that, he directed the Department's strategic planning and Education Reform implementation efforts for three years. [cto@doe.mass.edu]

Connie Louie has been with the Department of Education for fifteen years working with schools to implement technology in the classroom. She received her Masters degree in Media Specialist/Technology Instruction at Boston College. She was a classroom teacher in Hong Kong and in America. She is a mother of three grown children. She and her husband, an internist, live in Newton, Massachusetts. [clouie@doe.mass.edu] □

State of Edtech Report

The State of EdTech Report data demonstrates that in the past three years, Massachusetts has greatly improved its national ranking in terms of student-to-computer ratio and the development of Internet and LAN connectivity. For more information contact Matt Wormser [mwormser@doe.mass.edu].

Three years ago, the state of computers and other forms of educational technology in Massachusetts classrooms was cause for great concern. The State ranked 48th in national rankings on educational technology, with old, out of date equipment that was under-utilized, and poorly integrated into everyday classroom activities. For a state with an economy based largely on high technology and innovation, the situation was untenable.

As of the beginning of the 1998-99 school year, the State has clearly turned the corner. Student-computer ratios continue to improve, classroom connectivity to the Internet and local area networks is dramatically on the rise, and spending on technology is significantly outpacing inflation. The most recent surveys on educational technology place Massachusetts between 21st and 30th in the nation, a rapid improvement over recent years.

The data included in this update is culled from an on-line survey completed by fifty-five percent (204 out of 368) of the state's active school districts. What the data shows is truly remarkable. In just over a year since the FY'97 school profile update data was collected, Internet and local area network (LAN) access has more than doubled. Last June, at the end of the FY'97 reporting period, less than a quarter (23 percent) of the state's classrooms had access to the Internet. Today that number is over 50 percent. Access to LANs, enabling the advantages of networked computing for e-mail, printing and collaborative projects, has similarly increased, and now stands at 56 percent.

Similarly, computer access for students has never been better. There is now 1 computer for every 5.9 students in Massachusetts. This is an improvement from 8.4 in FY'97, and 7.2 as of June of this year (the closure of the FY'98 reporting). It represents a 17 percent increase in access in less than six months.

Table 1: Technology Access in Massachusetts Schools, FY'97-FY'99

	FY'97	FY'98	FY'99
Number of Students per High Speed "A" or "B" Computer	15.6	15.1	10.6
Number of Students per Any Computer Type	8.4	7.2	5.9
Percentage of Classrooms Connected to the Internet	23%	41%	51%
Percentage of Classrooms Connected to a LAN	26%	46%	54%

Computer access for students has never been better...

More dramatically, access to high-speed computers, those with Intel Pentium or Apple Power PC processors or newer, improved by 30 percent in the same time period. There is now 1 high-speed computer for every 10.6 students, compared to 15.1 students in June (Table 1).

Computer access is best at the high school level, where there is 1 computer for every 4.4 students statewide. At the elementary level, the number is 1 computer per every 7.2 students. In terms of high-speed Pentium or Power PC-based computers, high school students have 1 computer per 7.1 students. At the lower elementary grade levels, this number nearly doubles to 1 computer for every 13.8 students, indicating that more and higher quality computers are being deployed at the secondary school level compared to lower grade levels.

Access to networks is far more equitable across student age groups than computer access is, with variations of 5 percentage points or less being reported between the elementary, middle, and high school levels. These numbers can be seen in Table 2.

The most recent national survey, conducted by Market Data Research and released last month, puts Massachusetts 24th in the nation in terms of its multimedia computer access for students. This is a considerable improvement from its rankings of 48th in recent national surveys. The new ranking, combined with the Fall FY'99 Tech Profile Update data, indicates that the state is making significant gains improving student access to educational technology. □

Table 2: Technology Access in Massachusetts Schools, FY'97-FY'99

	Elementary	Middle	High
Number of Students per High Speed "A" or "B" Computer	13.8	11.7	7.1
Number of Students per any Computer Type	7.2	6.1	4.4
Percentage of Classrooms Connected to the Internet	49%	54%	51%
Percentage of Classrooms Connected to a LAN	53%	57%	53%

Top 25 Schools: Students per Type A/B Computer *

District Name	School Name	Students Per Computer Type: Type A/B	Year
Springfield	S.A.G.E.	0.83	1999
Springfield	High School Of Commerce	1.09	1999
Mashpee	Mashpee High	1.22	1998
Clinton	Clinton Senior High	1.24	1999
Framingham	Woodrow Wilson	1.32	1999
Seven Hills Chart	Seven Hills Charter	1.36	1999
Springfield	Chestnut Street Middle	1.36	1999
Springfield	Sumner Avenue	1.45	1999
Berkshire Hills	Stockbridge Plain	1.48	1999
Ware	Ware High	1.71	1999
Methuen	Marsh	1.82	1999
Mendon-Upton	Nipmuc Regional	1.84	1998
Frontier	Frontier Reg	1.89	1999
Springfield	High Sch/Science-Tech	1.95	1999
Wrentham	Vogel	1.95	1999
Stoughton	Stoughton High	2.00	1999
Lynn	Lynn Alternative HS	2.07	1999
Bellingham	Primavera Jr/Sr H S	2.08	1999
Boston	Mary Lyon	2.25	1999
Worcester	University Park Campus School	2.33	1998
Montachusett Voc	Montachusett Voc Tech	2.39	1999
Springfield	Milton Bradley School	2.40	1999
Worcester	Gates Lane	2.48	1998
Salem	Saltonstall School	2.69	1999
Somerville	West Somerville Neighborhood Schl	2.74	1999
State Average	-	**10.6**	

Top 25 Districts: Students per Type A/B Computer *

Seven Hills Charter Sch	1.40	1999
Worcester Trade Complex	1.80	1999
Frontier	1.90	1998
Chatham	2.00	1999
Montachusett Voc Tech	2.40	1999
Clinton	2.80	1999
Northern Berkshire Voc	3.10	1999
So Middlesex Voc Tech Reg	3.10	1999
Chesterfield-Goshen	3.30	1999
Hancock	3.50	1999
Martha's Vineyard	3.50	1999
Farmington River Reg	3.60	1998
City On A Hill Charter	3.70	1999
Rowe	3.70	1999
Pathfinder Voc Tech	3.80	1999
Marblehead Community Ch	3.90	1999
Upper Cape Cod Voc Tech	3.90	1999
Wrentham	3.90	1999
Mashpee	4.00	1999
Cape Cod Region Voc Tech	4.20	1998
Minute Man Voc Tech	4.20	1999
Nashoba Valley Tech	4.20	1999
Georgetown	4.30	1998
Ware	4.30	1999
Provincetown	4.40	1999
State Average	**10.6**	

**** A/B Computer: Computer with at least a Pentinm or PowerPC processor***

Top 25 Schools: Students per All Types of Computer

District Name	School Name	Students Per Computer Type: All Types	Year
Springfield	S.A.G.E.	0.83	1999
Berkshire Hills	Stockbridge Plain	0.84	1999
Methuen	Pleasant Valley School	1.09	1999
New Bedford	West Side Jr-Sr Hs	1.09	1999
Springfield	High School Of Commerce	1.09	1999
Framingham	Woodrow Wilson	1.13	1999
Seven Hills Charter	Seven Hills CS	1.21	1999
Mashpee	Mashpee High	1.22	1998
Clinton	Clinton Senior High	1.24	1999
Springfield	Chestnut Street Middle	1.24	1999
Wrentham	Vogel	1.24	1999
Springfield	Sumner Avenue	1.45	1999
Bellingham	Primavera Jr/Sr H S	1.46	1999
Rowe	Rowe Elem	1.51	1998
Boston	Mary Lyon	1.53	1999
Plymouth	Plymouth South High	1.60	1999
Stoughton	Stoughton High	1.61	1999
Holyoke	Holyoke Intensive Prog	1.62	1999
Dighton-Rehoboth	Dighton Middle School	1.64	1998
Ware	Ware High	1.71	1999
Mendon-Upton	Nipmuc Regional	1.71	1998
Lincoln	Hanscom Middle	1.74	1998
Frontier	Frontier Reg	1.76	1999
Worcester Trade	Worcester Voc High	1.79	1998
Southern Berkshire	Mt Everett Regional	1.80	1999
State Average	-	**5.90**	

Top 25 Districts: Students per All Types of Computers

Seven Hills Charter School	1.20	1999
Rowe	1.50	1999
Frontier	1.80	1998
Worcester Trade Complex	1.80	1999
Minute Man Vocational Tech	1.90	1999
MA Academy/Math & Science	1.90	1999
Chatham	2.00	1999
Montachusett Vocational Tech	2.10	1999
Florida	2.20	1999
South Shore Reg Voc Tech	2.20	1999
Lincoln	2.30	1999
Provincetown	2.30	1998
Franklin County	2.40	1999
Martha's Vineyard	2.50	1999
Nashoba Valley Tech	2.60	1999
Assabet Valley	2.70	1999
Clinton	2.70	1999
Hancock	2.70	1999
Southern Berkshire	2.70	1999
So Middlesex Voc Tech Reg	2.80	1998
Cape Cod Region Voc Tech	2.90	1999
City On A Hill Charter	2.90	1999
Northampton-Smith	2.90	1998
Marblehead Community Ch	3.00	1999
Martha's Vineyard Charter	3.00	1999
State Average	**5.90**	

District Data:	Students Per Computer Type:		Percent of Classrooms with Access to:		
District Name	Type A/B	All Types	Internet	LAN	Year
Abington	24.8	15.8	52%	40%	1999
Acton	7.2	5.5	100%	100%	1999
Acton-Boxborough	6.4	4.0	100%	100%	1999
Acushnet	11.6	7.5	70%	70%	1998
Adams-Cheshire	15.9	8.8	85%	85%	1998
Agawam	11.3	7.1	9%	7%	1999
Amesbury	6.5	6.1	41%	40%	1998
Amherst	7.9	5.6	39%	39%	1999
Amherst-Pelham	5.6	5.2	59%	59%	1999
Andover	5.9	5.4	100%	100%	1999
Arlington	12.3	6.2	99%	99%	1999
Ashburnham-Westminster	6.9	6.9	88%	88%	1999
Ashland	18.3	10.6	107%	107%	1998
Assabet Valley	5.5	2.7	57%	57%	1999
Athol-Royalston	6.1	5.6	23%	12%	1999
Atlantis Charter	9.3	9.3	0%	100%	1999
Attleboro	14.7	5.7	6%	22%	1999
Auburn	11.8	8.7	37%	37%	1999
Avon	18.0	7.6	0%	5%	1998
Ayer	10.8	4.2	100%	100%	1999
Barnstable	8.9	5.3	80%	80%	1999
Bedford	8.0	6.4	100%	100%	1999
Belchertown	18.0	13.5	31%	59%	1998
Bellingham	15.5	9.1	10%	64%	1999
Belmont	29.3	15.0	2%	0%	1999
Benjamin Banneker Charter	4.7	4.7	100%	100%	1998
Benjamin Franklin Charter	21.3	11.6	13%	100%	1998
Berkley	45.8	11.6	14%	0%	1999
Berkshire Hills	7.5	5.2	18%	18%	1999
Berlin	18.5	6.0	15%	0%	1998
Berlin-Boylston	11.1	5.3	14%	14%	1998
Beverly	40.6	8.3	8%	2%	1999
Billerica	68.4	10.1	17%	17%	1998
Blackstone Valley Reg	6.5	3.4	3%	7%	1999
Blackstone-Millville	12.2	9.1	34%	12%	1999
Blue Hills Voc	29.3	3.2	28%	28%	1999
Boston	12.1	6.4	30%	30%	1999
Bourne	9.0	5.9	75%	70%	1999
Boxborough	10.0	8.2	100%	100%	1998
Boxford	7.2	5.0	100%	100%	1999
Boylston	170.5	14.2	11%	0%	1998
Braintree	7.3	5.2	33%	33%	1999
Brewster	7.3	5.2	48%	38%	1999
Bridgewater-Raynham	13.8	8.5	57%	57%	1999
Brimfield	11.9	7.4	3%	0%	1999
Bristol County Agr	11.8	11.8	0%	100%	1998
Bristol-Plymouth Voc Tech	5.0	4.0	4%	7%	1999
Brockton	21.4	14.8	2%	0%	1998
Brookfield	11.9	6.7	2%	2%	1999
Brookline	8.6	4.7	58%	58%	1999

District Name	Students Per Computer Type: Type A/B	Students Per Computer Type: All Types	Percent of Classrooms with Access to: Internet	Percent of Classrooms with Access to: LAN	Year
Burlington	13.9	5.4	48%	48%	1999
Cambridge	8.8	5.0	97%	96%	1999
Canton	55.3	8.7	7%	0%	1998
Cape Cod Lighthouse Chart	5.8	5.1	93%	93%	1999
Cape Cod Region Voc Tech	4.2	2.9	100%	100%	1999
Carlisle	28.6	7.9	10%	3%	1998
Carver	34.8	7.6	22%	58%	1999
Central Berkshire	31.6	7.8	35%	73%	1998
Chatham	2.0	2.0	100%	100%	1999
Chelmsford	7.8	5.5	70%	70%	1999
Chelmsford Alliance/Ed Ch	58.3	5.8	100%	100%	1998
Chelsea	6.3	5.6	100%	100%	1999
Chesterfield-Goshen	3.3	3.3	0%	0%	1999
Chicopee	12.9	8.1	99%	99%	1999
City On A Hill Charter	3.7	2.9	100%	100%	1998
Clarksburg	105.0	5.3	100%	100%	1998
Clinton	2.8	2.7	97%	96%	1999
Cohasset	22.1	6.9	6%	5%	1999
Community Day Chart	7.8	4.6	100%	100%	1998
Concord	11.0	6.0	100%	100%	1999
Concord-Carlisle	8.2	4.8	27%	100%	1999
Conway	33.8	6.2	100%	100%	1999
Danvers	10.8	7.7	69%	69%	1999
Dartmouth	14.6	6.3	14%	71%	1999
Dedham	31.1	5.4	21%	68%	1998
Deerfield	13.0	7.1	100%	100%	1999
Dennis-Yarmouth	11.8	6.4	63%	63%	1999
Dighton-Rehoboth	13.5	5.5	50%	76%	1998
Douglas	12.6	7.4	91%	91%	1999
Dover	9.2	8.5	42%	42%	1999
Dover-Sherborn	11.3	3.8	7%	4%	1999
Dracut	25.7	7.0	44%	86%	1998
Dudley-Charlton Reg	17.6	8.7	7%	2%	1999
Duxbury	11.2	5.0	81%	81%	1999
East Bridgewater	14.8	8.4	89%	74%	1998
East Longmeadow	16.6	7.3	40%	49%	1999
Eastham	31.2	6.1	8%	127%	1999
Easthampton	15.4	7.0	32%	31%	1999
Easton	15.0	8.3	2%	0%	1998
Edgartown	6.2	4.6	100%	100%	1999
Erving	8.6	3.6	100%	100%	1998
Essex	5.8	3.5	100%	100%	1999
Essex Agr Tech	8.6	3.9	10%	8%	1999
Everett	33.1	8.6	9%	6%	1999
Fairhaven	8.7	6.6	88%	58%	1999
Fall River	22.5	8.1	8%	7%	1999
Falmouth	22.6	9.1	54%	51%	1999
Farmington River Reg	3.6	3.6	100%	100%	1999
Fitchburg	65.6	12.9	80%	80%	1998
Florida	8.9	2.2	0%	0%	1998

District Name	Students Per Computer Type: Type A/B	All Types	Percent of Classrooms with Access to: Internet	LAN	Year
Foxborough	10.5	6.0	58%	58%	1999
Framingham	11.9	6.3	49%	97%	1999
Francis W Parker Charter	5.8	5.6	100%	100%	1998
Franklin	7.5	5.2	72%	99%	1998
Franklin County	6.4	2.4	100%	100%	1998
Freetown	169.0	8.6	3%	0%	1998
Freetown-Lakeville	40.7	7.9	4%	0%	1998
Frontier	1.9	1.8	100%	100%	1999
FY'99 State Totals	10.6	5.9	51%	23%	1999
Gardner	29.7	7.8	1%	8%	1998
Gateway	8.5	6.1	17%	100%	1999
Georgetown	4.3	4.0	58%	88%	1999
Gill-Montague	27.7	10.0	88%	53%	1998
Gloucester	8.8	5.6	53%	28%	1999
Grafton	36.2	9.4	31%	100%	1999
Granby	19.0	11.4	100%	0%	1998
Granville	18.0	6.8	5%	39%	1998
Greater Fall River	4.7	3.4	39%	12%	1999
Greater Lowell Voc Tec	14.0	7.3	12%	52%	1998
Greater New Bedford	8.8	4.7	50%	26%	1999
Greenfield	17.0	4.7	33%	68%	1998
Groton-Dunstable	39.6	5.5	54%	0%	1999
Hadley	44.2	15.1	0%	100%	1998
Halifax	15.8	8.3	100%	62%	1999
Hamilton-Wenham	17.6	6.9	62%	80%	1999
Hampden-Wilbraham	15.7	5.7	80%	100%	1999
Hampshire	6.3	4.3	100%	20%	1998
Hancock	3.5	2.7	100%	100%	1998
Hanover	8.3	4.8	100%	100%	1999
Harvard	10.8	5.5	100%	70%	1999
Harwich	8.9	5.2	63%	100%	1999
Hatfield	6.6	4.4	100%	19%	1999
Haverhill	98.2	9.9	18%	50%	1998
Hawlemont	27.3	8.3	50%	0%	1998
Hilltown Charter School	0.0	12.0	0%	67%	1998
Hingham	22.2	10.5	67%	1%	1998
Holbrook	39.6	10.7	4%	79%	1998
Holland	22.3	13.4	0%	59%	1999
Holliston	7.9	5.5	60%	23%	1999
Holyoke	12.7	7.2	22%	55%	1999
Hopedale	13.6	7.4	58%	100%	1999
Hopkinton	6.7	4.3	57%	74%	1999
Hudson	16.4	8.4	74%	47%	1998
Hull	11.5	7.1	23%	62%	1999
Ipswich	12.9	4.2	74%	100%	1998
King Philip	6.2	3.7	100%	100%	1999
Kingston	7.8	6.3	100%	0%	1999
Lakeville	0.0	10.1	3%	27%	1998
Lanesborough	10.8	7.4	27%	84%	1998
Lawrence	15.3	3.9	5%	100%	1999

District Name	Students Per Computer Type: Type A/B	Students Per Computer Type: All Types	Percent of Classrooms with Access to: Internet	Percent of Classrooms with Access to: LAN	Year
Lawrence Family Dev Chart	17.7	7.5	100%	100%	1999
Lee	8.9	6.4	100%	88%	1999
Leicester	10.4	8.2	88%	100%	1999
Lenox	5.0	4.3	100%	10%	1998
Leominster	12.5	8.7	4%	36%	1999
Leverett	49.5	8.6	36%	100%	1998
Lexington	8.1	4.4	100%	100%	1999
Lincoln	7.0	2.3	100%	6%	1998
Lincoln-Sudbury	7.9	4.0	6%	1%	1999
Littleton	28.9	8.6	8%	55%	1998
Longmeadow	15.8	7.8	40%	95%	1998
Lowell	12.3	4.9	95%	29%	1999
Lowell Middlesex Acad Ch	8.6	8.6	29%	14%	1998
Ludlow	38.2	11.1	17%	2%	1998
Lunenburg	17.8	7.8	4%	21%	1999
Lynn	18.1	8.7	20%	33%	1999
Lynnfield	10.4	4.9	37%	100%	1999
Ma Academy/Math & Science	6.8	1.9	25%	6%	1999
Malden	17.5	12.1	8%	55%	1998
Manchester	38.4	5.8	54%	96%	1998
Mansfield	54.0	12.5	81%	78%	1999
Marblehead	9.6	6.8	35%	100%	1998
Marblehead Community Ch	3.9	3.0	100%	6%	1999
Marion	17.6	4.8	6%	84%	1999
Marlborough	17.8	9.9	84%	37%	1999
Marshfield	34.1	11.7	39%	100%	1998
Martha's Vineyard	3.5	2.5	100%	100%	1999
Martha's Vineyard Charter	4.6	3.0	100%	16%	1999
Masconomet	11.0	7.5	16%	34%	1999
Mashpee	4.0	3.5	37%	100%	1998
Mattapoisett	9.2	4.4	100%	100%	1999
Maynard	8.7	5.2	100%	100%	1998
Medfield	17.9	8.8	100%	1%	1999
Medford	119.0	9.9	0%	61%	1998
Medway	6.2	4.8	34%	28%	1999
Melrose	357.0	10.4	28%	66%	1999
Mendon-Upton	7.9	7.1	64%	72%	1998
Methuen	5.4	4.4	72%	86%	1999
Middleborough	4.8	4.2	86%	100%	1999
Middleton	15.3	6.2	47%	69%	1999
Milford	8.9	7.2	12%	28%	1999
Millbury	10.9	8.2	28%	100%	1999
Millis	14.4	3.9	100%	33%	1999
Milton	15.4	10.0	9%	66%	1999
Minute Man Voc Tech	4.2	1.9	47%	54%	1999
Mohawk Trail	14.6	6.6	48%	91%	1998
Monson	26.9	3.7	3%	100%	1998
Montachusett Voc Tech	2.4	2.1	100%	100%	1999
Mount Greylock	6.6	5.3	100%	0%	1998
Nahant	250.0	3.9	9%	0%	1998

District Name	Students Per Computer Type: Type A/B	All Types	Percent of Classrooms with Access to: Internet	LAN	Year
Nantucket	18.0	5.4	22%	12%	1999
Narragansett	34.7	10.2	22%	89%	1998
Nashoba	12.7	5.9	44%	100%	1998
Nashoba Valley Tech	4.2	2.6	100%	41%	1999
Natick	14.7	5.4	49%	69%	1999
Nauset	8.1	4.5	58%	98%	1999
Needham	13.4	6.6	98%	26%	1999
New Bedford	31.4	8.2	26%	5%	1999
New Salem-Wendell	68.0	12.0	5%	76%	1998
Newburyport	16.4	8.6	76%	51%	1999
Newton	14.7	5.6	46%	100%	1998
Norfolk	16.8	4.7	100%	5%	1998
Norfolk County Agr	15.0	13.7	5%	56%	1999
North Adams	28.7	9.0	56%	100%	1999
North Andover	6.0	3.6	100%	4%	1999
North Attleborough	23.3	10.5	6%	100%	1998
North Brookfield	5.3	3.6	100%	39%	1999
North Middlesex	14.0	7.5	20%	28%	1999
North Reading	121.9	9.3	60%	18%	1998
North Shore Reg Voc	5.2	3.4	18%	100%	1998
North Star Academy Chart	5.4	5.4	100%	40%	1999
Northampton	13.2	5.7	39%	6%	1999
Northampton-Smith	9.7	2.9	4%	100%	1998
Northboro-Southboro	12.8	4.7	100%	100%	1998
Northborough	13.3	10.2	100%	72%	1998
Northbridge	12.8	5.8	53%	4%	1999
Northeast Metro Voc	4.8	4.2	4%	30%	1998
Northern Berkshire Voc	3.1	3.0	30%	100%	1998
Norton	7.2	4.5	100%	76%	1999
Norwell	12.6	6.7	76%	100%	1999
Norwood	8.8	7.2	100%	100%	1999
Oak Bluffs	5.0	3.8	100%	80%	1999
Old Colony Reg Voc Tech	5.3	3.2	100%	6%	1999
Old Rochester	11.5	5.7	8%	100%	1999
Orange	7.7	4.5	100%	86%	1999
Orleans	26.4	6.3	41%	0%	1999
Oxford	73.3	19.1	4%	95%	1999
Palmer	18.7	8.5	28%	83%	1999
Pathfinder Voc Tech	3.8	3.4	83%	57%	1999
Peabody	17.7	7.6	49%	57%	1998
Pelham	11.8	7.9	43%	98%	1999
Pembroke	13.0	9.0	98%	71%	1999
Pentucket	13.9	6.0	58%	0%	1998
Petersham	5.6	4.1	100%	43%	1998
Pioneer Valley	37.2	9.5	5%	50%	1998
Pioneer Valley Perf Arts	9.5	7.0	40%	38%	1998
Pittsfield	23.3	7.8	38%	2%	1998
Plainville	14.4	8.1	4%	87%	1999
Plymouth	8.4	4.0	88%	100%	1999
Plympton	7.2	4.5	100%	67%	1999

District Name	Students Per Computer Type: Type A/B	Students Per Computer Type: All Types	Percent of Classrooms with Access to: Internet	Percent of Classrooms with Access to: LAN	Year
Provincetown	4.4	2.3	69%	52%	1999
Quabbin	18.8	10.2	48%	62%	1998
Quaboag Regional	31.9	4.3	62%	100%	1999
Quincy	20.5	9.2	100%	96%	1999
Ralph C Mahar	8.9	4.5	49%	100%	1999
Randolph	17.5	10.0	100%	92%	1999
Reading	8.2	6.5	93%	100%	1999
Revere	11.3	5.9	100%	32%	1998
Richmond	7.3	4.2	32%	100%	1998
Rochester	8.1	4.1	100%	100%	1999
Rockland	10.8	6.6	100%	93%	1999
Rockport	13.4	7.1	93%	75%	1999
Rowe	3.7	1.5	75%	19%	1998
Salem	10.4	3.9	9%	46%	1999
Sandwich	25.6	11.0	46%	46%	1999
Saugus	14.5	5.4	6%	80%	1998
Savoy	0.0	9.5	80%	48%	1998
Scituate	13.2	10.0	48%	60%	1998
Seekonk	12.0	5.4	62%	100%	1999
Seven Hills Charter Sch	1.4	1.2	100%	100%	1999
Sharon	9.4	5.7	100%	82%	1999
Shawsheen Valley Voc Tech	5.6	3.1	82%	0%	1998
Sherborn	15.4	8.4	9%	93%	1999
Shirley	14.2	13.6	93%	100%	1998
Shrewsbury	6.0	5.0	100%	0%	1999
Shutesbury	28.0	10.7	14%	100%	1998
Silver Lake	6.2	4.9	100%	6%	1999
So Middlesex Voc Tech Reg	3.1	2.8	6%	50%	1999
Somerset	7.0	5.5	50%	6%	1999
Somerville	12.5	9.4	13%	4%	1999
Somerville Charter School	14.6	14.2	4%	62%	1999
South Hadley	19.0	8.0	57%	96%	1999
South Shore Charter	6.6	3.9	96%	29%	1999
South Shore Reg Voc Tech	5.4	2.2	71%	100%	1999
Southampton	38.6	9.2	100%	3%	1998
Southborough	12.9	10.1	3%	100%	1998
Southbridge	13.5	4.7	88%	6%	1998
Southeastern Reg Voc Tech	9.2	4.9	0%	97%	1998
Southern Berkshire	8.8	2.7	100%	53%	1999
Southern Worcester Cty VT	5.1	4.0	53%	100%	1999
Southwick-Tolland	33.0	9.6	100%	54%	1998
Spencer-E Brookfield	12.6	5.3	37%	18%	1998
Springfield	7.3	5.2	18%	60%	1999
Stoneham	23.9	9.3	61%	26%	1998
Stoughton	5.2	3.9	59%	30%	1999
Sturbridge	17.0	10.4	91%	53%	1999
Sudbury	12.7	6.3	57%	100%	1999
Sunderland	10.2	4.5	100%	32%	1999
Sutton	7.6	6.4	32%	0%	1998
Swampscott	33.9	11.5	20%	19%	1998

District Name	Students Per Computer Type: Type A/B	All Types	Percent of Classrooms with Access to: Internet	LAN	Year
Swansea	15.9	7.4	33%	38%	1998
Tantasqua	17.0	7.6	38%	36%	1999
Taunton	9.8	6.2	36%	33%	1998
Tewksbury	32.7	11.0	33%	100%	1999
Tisbury	5.2	3.8	100%	3%	1999
Topsfield	4.8	4.7	6%	28%	1999
Tri County	4.4	3.4	28%	55%	1998
Triton	18.6	7.9	55%	100%	1999
Truro	8.4	3.4	20%	73%	1999
Tyngsborough	21.0	5.5	74%	100%	1999
Up-Island Regional	4.7	3.5	100%	100%	1999
Upper Cape Cod Voc Tech	3.9	3.4	98%	20%	1999
Uxbridge	11.0	8.5	3%	100%	1999
Wachusett	5.8	4.3	99%	6%	1999
Wakefield	86.4	8.7	15%	100%	1999
Wales	110.5	18.4	100%	60%	1999
Walpole	11.5	6.2	15%	28%	1999
Waltham	20.9	8.0	28%	68%	1999
Ware	4.3	4.1	47%	100%	1999
Wareham	9.1	4.1	100%	100%	1999
Watertown	10.5	6.1	100%	100%	1999
Wayland	10.0	5.5	100%	4%	1999
Webster	25.8	7.3	6%	28%	1999
Wellesley	7.2	5.0	32%	5%	1999
Wellfleet	6.5	5.2	5%	100%	1999
West Boylston	26.4	6.3	3%	0%	1998
West Bridgewater	13.3	8.7	2%	4%	1998
West Springfield	37.2	8.3	5%	100%	1998
Westborough	6.2	5.1	100%	85%	1999
Westfield	10.4	5.9	77%	100%	1999
Westford	21.4	7.6	100%	100%	1998
Westhampton	56.3	11.3	100%	67%	1998
Weston	6.2	3.8	67%	34%	1999
Westport	10.3	4.8	34%	40%	1999
Westwood	12.2	6.4	49%	49%	1999
Weymouth	17.1	6.9	57%	100%	1999
Whately	29.4	5.4	100%	91%	1999
Whitman-Hanson	9.5	6.9	91%	4%	1998
Whittier Voc	7.6	4.2	3%	100%	1998
Williamsburg	10.9	10.1	100%	62%	1999
Williamstown	14.9	5.7	62%	52%	1998
Wilmington	18.2	9.8	53%	77%	1999
Winchendon	78.3	9.1	3%	50%	1998
Winchester	20.5	6.8	50%	3%	1998
Winthrop	25.1	12.5	7%	1%	1998
Woburn	38.2	17.2	0%	58%	1998
Worcester	8.3	8.3	58%	87%	1998
Worcester Trade Complex	1.8	1.8	80%	76%	1998
Wrentham	3.9	3.4	76%	55%	1999

What is really important is MOBILIZING POWERFUL IDEAS

-SEYMOUR PAPERT

IMS Report

The IMS is radically changing the way the DOE conducts business. Early indicators show that collecting and storing data electronically is a dramatic improvement over paper systems. For more information contact Maureen Lovett [mlovett@doe.mass.edu].

The Massachusetts Department of Education is developing a comprehensive, web-based information system to replace the paper-based data collection and information system that is currently used to exchange information between the Department and school districts. The new system is being designed to fulfill the accountability requirements of the Education Reform Act and to improve the timeliness and accuracy of information. The goals of the Information Management System are to:

- Improve data collection methodology by reducing or eliminating paper-based systems;
- Shift from reliance on school and/or district aggregate data to individual student data;
- Track students within and across districts over time; and
- Reassign ownership of data from the Department of Education to districts.

IMS Systems - IMS Development

The IMS consists of four strands:

- District Information Management System (DIMS)
- Student Information Management System (SIMS)
- Personnel Information Management System (PIMS)
- Administration Information Management System (AIMS)

These strands represent different aspects of the education process in Massachusetts. Each has particular requirements that will be addressed by the development of software applications.

District IMS (DIMS)

The focus of the DIMS is on developing "Smart Forms" (web forms that validate data before it is submitted to the Department of Education) to replace existing data collection forms. The Smart Forms will be implemented for all school or district-based data collection, such as for grants management or the child nutrition program.

In the short term, Smart Forms will be used as an interim step for those data collections that involve counts of students in aggregated form. Districts that are not ready to transmit individual student data to the Department of Education will use Smart Form versions of existing student data collections, such as the Individual School Report.

The first Smart Form, the Technology Plan Update, required as part of the application for the FY'99 Technology Grant, was implemented in April, 1998. The End of Year forms—School Attending Children and Special Education Exit Data—were available as Smart Forms in June/July 1998. The FY'99 Smart Forms are scheduled to be available as listed on page 24.

Student Information Management System (SIMS)

The SIMS is intended to collect the information necessary to meet mandated State and Federal reporting and to support Education Reform requirements for student assessment and evaluation of school programs. For example, the most significant of these requirements - the MCAS - creates the need for the Department of Education to collect information about individual students since MCAS results will be used to certify each student's eligibility for a high school diploma.

Security...will be accomplished by a combination of technical and policy mechanisms...

Consequently, the SIMS must be able to track individual students across the state over time in order to match students with tests scores and other pertinent data. In addition, the Education Reform Act's accountability and program evaluation requirements can be satisfied only with information on each student and the programs in which the student is involved.

The SIMS consists of four components:

- State Student Registration will register each student with a state-assigned identification (SASID) number, using a locally-assigned student identification number (LASID), first name, middle name, last name, gender, date of birth and place of birth to establish uniqueness for each student.
- The Student Filter will allow districts to consolidate, validate and transmit files that contain the 35 data elements that must be collected, maintained and submitted for each student who enrolls in a district during a school year. These data elements have been specified in the "Data Standards Handbook for the Massachusetts Student Information Management System" that was distributed to Superintendents in October.
- Student Reconciliation will validate the student data at the Department of Education and reconcile inconsistencies for student records across all districts in Massachusetts.
- Student Publication will manage requests for data, extracting and aggregating the data as appropriate, and make the data available for use.

The FY'99 plans for the SIMS include the development of the State Student Registration application and the Student Filter to support the submission of individual student data in the 1999-2000 school year. The schedule for SIMS roll-out is listed below:

Personnel Information Management System

The PIMS will include the existing certification and recertification systems as well as systems to collect individual staff data to support State and Federal reporting requirements. Current development efforts focus on the migration of the existing systems to a new platform and ensuring that the systems are Year 2000 compliant. In addition, aggregate data collection forms that involve district staff will be converted to Smart Forms prior to the development of the individual staff system.

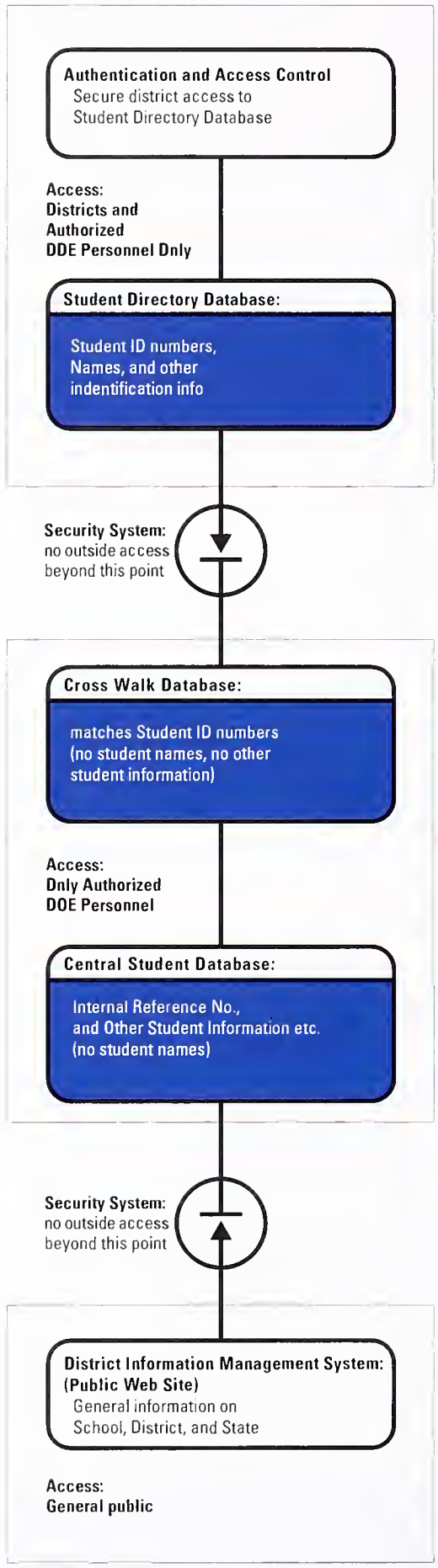
Administration Information Management System (AIMS)

The AIMS involves several internal Department of Education components as well as those components required to administer the IMS across all districts. For example, the AIMS must provide security in order to meet the Department's ethical and legal responsibility to protect the confidentiality and the integrity of the data collected. During the 1998-99 school year, the current two-tiered user name and passwords will evolve into a distributed security administration and management protocol that will support the assignment of user names and passwords, the authentication of user access, the management of application authorities, privileges and permissions and the identification of user roles.

Security for the IMS will be accomplished by a combination of technical and policy mechanisms that will be designed to protect the information without destroying its utility. Technical approaches to security, such as encryption, will be utilized where appropriate, and the Department of Education will implement policies to control access to data.

SIMS Schedule:	
State Student Registration to assign identification numbers to all students	September, 1999
Submission of Category 1 Data Elements using the Student Filter	Fall 1999

IMS Database Security Scheme:



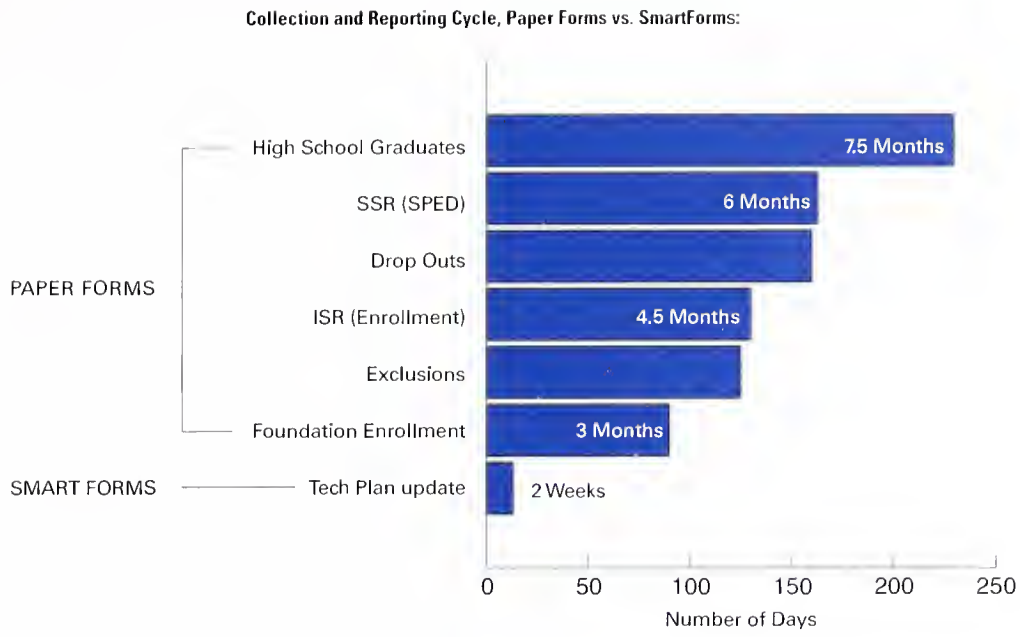
IMS Implementation - IMS Rollout

The implementation of the IMS in Massachusetts school districts has been supported by ten field technologists since the fall of 1996. These ten field technologists, combined with a District Roll-out Team Leader and a Training Manager, constitute the IMS Roll-out Team. Each field technologist provides training and support services to about 37 school districts. These services include analysis of each district's readiness to participate in the IMS, assistance in upgrading browsers to a minimum standard, browser training, technical support for completing Smart Forms, and detailed analysis and assistance for meeting the Category 1 Data Standards.

In the 1998-99 school year, the District Roll-out effort will focus on assisting districts in:

- The collection and maintenance of the directory data elements required for the State Student Registration that will assign an identification number to each student in Massachusetts;
- Implementation of the Smart Forms as the mandatory process for submitting data to the Department of Education;
- Implementation of the distributed username and password system to provide secure access to Department of Education applications; and
- The collection and maintenance of data as specified by the Category 1 Data Standards for the SIMS.

During the past two years, the Roll-out team has conducted site visits to each of the operational districts to determine their current technological status relative to the IMS and to provide information related to Educational Technology. These site visits also set the stage for the development of the District Implementation Plans specific to each district. These plans outline the goals and objectives the district must meet in order to implement the SIMS. During the winter of 1999, Field Technologists will be reviewing these plans with the districts. □



To prepare for the roll-out of these two SIMS applications, districts must have:

Need:	DATE
1. Access to the Internet and a computer capable of running Internet Explorer 4.0 or Netscape 4.0	Now
2. A unique, unduplicated and permanent locally assigned identification number for each student	Spring 1999
3. The seven data elements required to participate in the State Student Registration - first name, middle name, last name, gender, date of birth and city/town of birth (in required format)	June 1999
4. The data represented by the Category 1 Data Standards for each student	Fall 1999

SmartForm Schedule:

Form:		Availability
Technology Profile Update FY99	District/School	October
Mathematics, Science & Technology Survey	District/School	October
Foundation Enrollment Form	District	October
Special Education Federal Child Count	District	December
Student Exclusion Form	School	January/99
Grants RF-1	District	Spring/99
School Attending Children	District	Spring/99
Special Education Exit Data Collection	District	End of Year
Year End School Indicator Report	School	End of Year

MassEd.Net Report

Affordable Internet Access through MassEd.Net provides a powerful new tool for teachers. This report summarizes the vision, implementation, and current status of the State's educational Internet service. For more information about MassEd.Net contact Tom Iacobucci [tiacobucci@doe.mass.edu].

Why it was created

As stated in the Commissioner's letter, the Department has had three goals for educational technology: to provide improved learning opportunities for students, to provide powerful new tools to enhance the professional capabilities of teachers, and to increase the efficiency and effectiveness of our administrative systems. MassEd.Net was created as part of our effort to meet the second goal—to give powerful new tools to teachers.

The explosion of interest and participation in the World Wide Web was almost a mandate for us to provide teachers with something they couldn't buy on the market—an Internet access service that combined "best-of-class" service, an education focus, and bargain-basement price. We set our sights high because we wanted to reach those educators who had either not yet found a reason to "get on-line", or whose needs weren't being met by existing services. Although there were several Internet service providers offering education-specific Internet service (such as MEOL and UMass K-12), and several providers who offered low prices, none met the particular combination of benchmarks we established.

How it was created

In order to meet the goals we set for the service, we had to "think out of the box." We knew we had to have expert opinion to help us wade through the rhetoric and jargon of the vendors, so we joined forces with the Massachusetts Information Technology Division. Next, we invited several consultants with the political, technical, and policy expertise we needed to join us, and we called our group the Educational Technology Advisory Group (ETAG). This unusual partnership, joining agency to agency and public to private, proved to be invaluable.

Ordinarily, the state would consider either buying an existing service and using the bulk purchase to pass along discounted rates to users, or building a service from scratch. We sent out an RFR and got responses from a strong group of Internet Service Providers (ISPs), each offering a different strategy for how to meet our needs. After a formal selection process, we chose a combination of vendors who, when taken together, represented a new option: building the system from existing parts. Thus, we chose a vendor that subcontracted to a Competitive Local Exchange Carrier (CLEC) called Global NAPs, and a small and innovative ISP called JavaNet. By using a CLEC to provide the data transport and dial-up network, we were able to take advantage of a technical infrastructure with two huge advantages—toll-free dial-up access anywhere in the Commonwealth, and a so-called "megaPOP" architecture that centralizes all modems in a single location (thereby drastically reducing operating costs). Similarly, using JavaNet offered its own advantages, such as the ability to staff the MassEd.Net call center with students from Springfield Technical College, located across the street from JavaNet's offices.

Putting together the deal was only part of the issue, however. The next step was, in some ways, the most important. We purchased enough capacity to offer twenty thousand subscribers free access for nine months and $25 per year thereafter. While we were confident that this offer was too good for most people to pass up, we were concerned that if we only got fifteen thousand users (which would have been bigger than MEOL and UMass K-12 combined) we

The response was phenomenal... in the first week over three thousand educators registered

would have paid for capacity we couldn't use. To get the word out about the service, we asked Governor A. Paul Cellucci to write a letter inviting educators to join MassEd.Net, and included a coupon for the free service and free registration software, including a web browser.

The response was phenomenal. In the first week alone over three thousand educators registered their MassEd.Net accounts on-line. We now have more than twenty-five thousand subscribers. This blistering pace makes MassEd.Net one of the fastest growing Internet Service Providers (ISPs) in Massachusetts.

What we learned

State government can be innovative - MassEd.Net broke the model of "buy it off the shelf or build it from scratch." Even though the deal sounded almost too good to be true, we made sure that the business model made sense to both the Commonwealth and the vendors. The end result is that the service costs dramatically less than any service on the market, the vendors are happy and are eager to participate, and educators are getting the service they have long deserved.

Partnerships are essential -The Department knew it didn't have the in-house expertise to build the service on its own. By partnering with the Information Technology Division, and by hiring consultants who knew the landscape and cared about education, we were able to do something that would otherwise have been impossible. It wasn't magic—all the pieces were there for anyone to pick up—but it took a partnership to bring it together. The process also emphasized how creative state agencies can be when they work together. In other contexts such collaboration has proven to be full of difficulties, if not contentious.

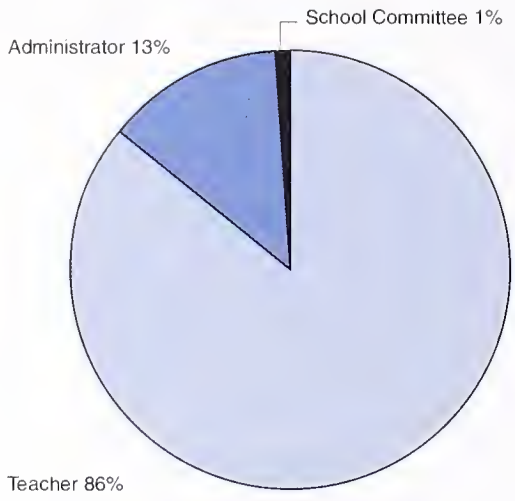
Price matters - When we were designing the service we asked ourselves what was keeping the majority of educators from getting on-line. We observed that other education-specific services did many things right, but failed to capture a large chunk of the educator population. We decided that price was a deciding factor for people, because Internet service has become a kind of commodity. By offering the service for free for nine months, and $25 a year thereafter, we broke through a barrier that has kept many educators from getting Internet access. Now, nine months after we introduced the service, we have registered approximately one third of all Massachusetts public K-12 teachers.

'Net access is for everyone - As the statistics demonstrate, MassEd.Net has an appeal that reaches across age, years of teaching, and subject taught. MassEd.Net users, when compared to the universe of Massachusetts educators, don't look any different. In other words, the service isn't just for young male "techies."

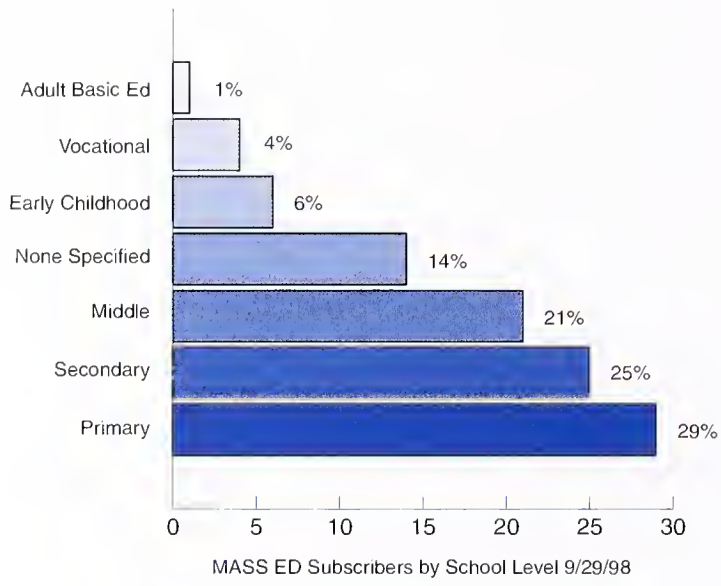
Status Report

Account Renewal - The renewal system was rolled out in October. Superintendents have determined which educators in their districts are eligible for a subsidized account. The basic eligibility standards are: educators must be actively employed by a Massachusetts public school district and have an instructional role, or serve as a business officer or nutrition director, or be an elected or appointed member of the school committee. Because this is a publicly funded program, it is important to preserve the integrity of the system, so that only eligible educators are subsidized by the state. Superintendents have also been provided with an opportunity to pay the $25 annual subscription cost for educators from their districts.

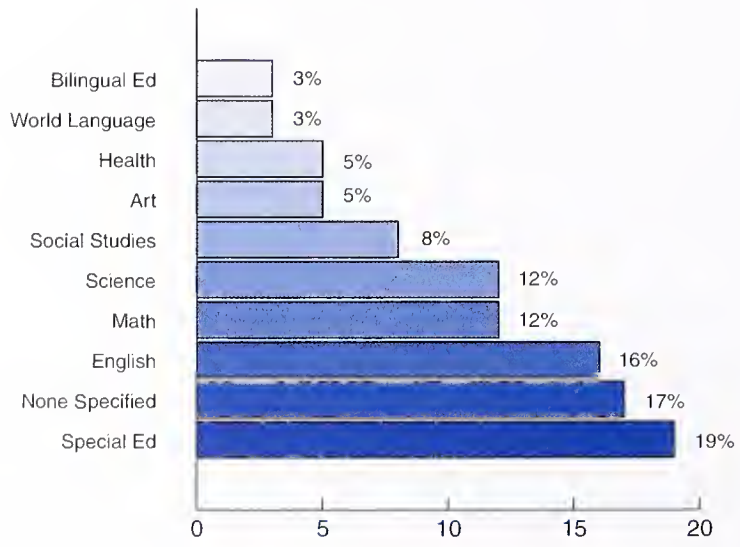
In those cases in which a district decided not to pay for the accounts of eligible educators in the district, a notice was sent to all affected educators during the last week in October. These eligible educators will still have their accounts subsidized by the State, but will have to pay the $25 annual fee themselves. They can renew on-line, through our secure transaction system, using a MasterCard, Visa, American Express or Discover credit card. We will not be able to accept any other forms of payment (e.g. cash, checks and other types of credit cards). Individual renewals must be made through the on-line process; this requirement was included in our contract with the Internet Service Provider, in order to keep operational costs from raising the subscription price.



MASS ED Subscribers by Position 9/29/98



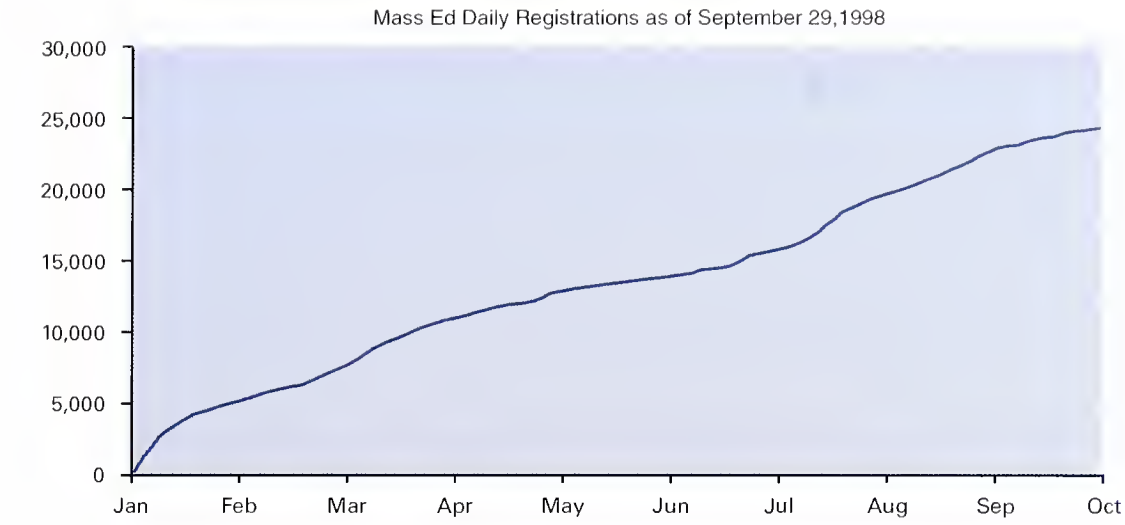
MASS ED Subscribers by School Level 9/29/98

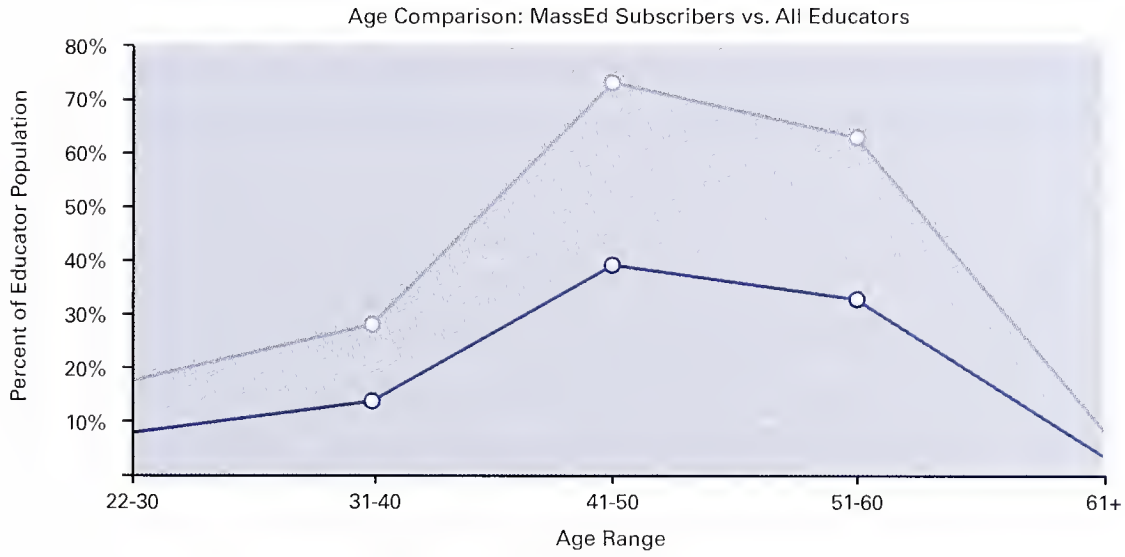


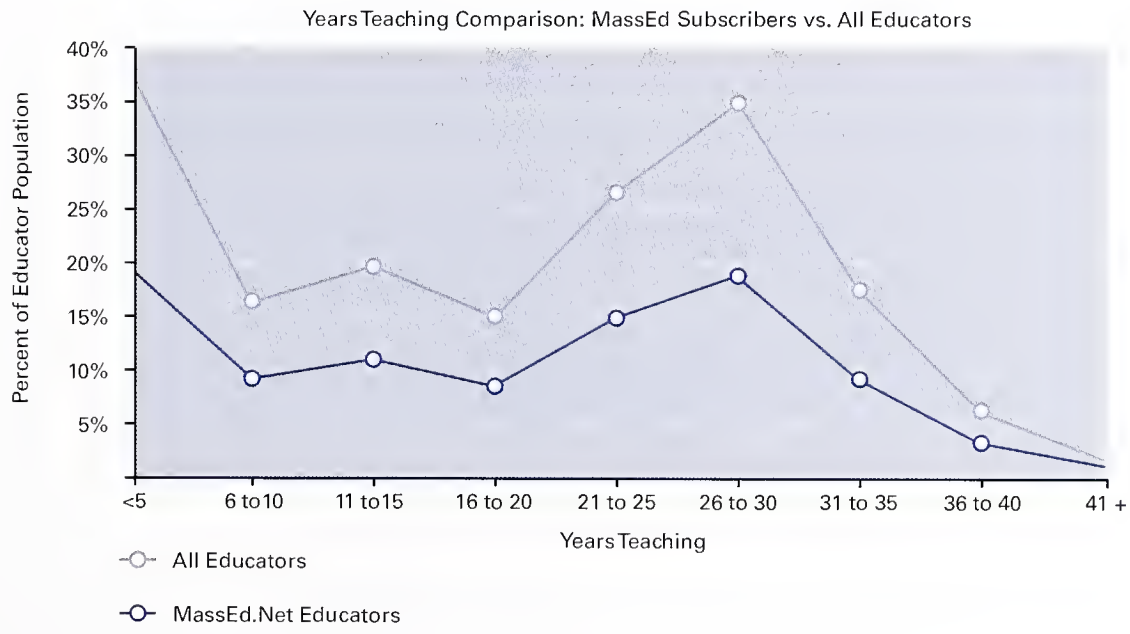
MASS ED Subscribers by Subject Specialty 9/29/98

Upcoming Feature

MassEd.Net will soon release an exciting new feature for its users. The service, called MassList, will allow users to subscribe, unsubscribe, and create e-mail distribution lists. If you've ever tried to unsubscribe from a distribution list, you know how difficult it can be. With MassList, subscribing to, unsubscribing from, and creating education-specific lists will be done through an easy-to-use web page. Users who create lists will "own" the lists and will be able to determine whether any other MassEd.Net user can automatically join the list or whether other users will have to be granted permission to join. List "owners" can also remove unruly members from the list. As an example, a fourth grade math teacher could create a list for other fourth grade math teachers across the state. He or she would go to the MassList web page, create a name for the list, indicate whether it will be open (anyone can join) or moderated (join only with permission from the owner), and then enter in any MassEd.Net e-mail addresses of users they know will want to join. Once the list has been created, other users will be able to see the list name, the list purpose (e.g. "for discussion of topics pertinent to fourth grade math teachers"), and, if the list is open, join the list. Stay tuned to your MassEd.Net e-mail for an announcement about MassList! □


Mass Ed Daily Registrations as of September 29,1998
30,000
25,000
20,000
15,000
10,000
5,000
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct


Age Comparison: MassEd Subscribers vs. All Educators
Percent of Educator Population
80%
70%
60%
50%
40%
30%
20%
10%
22-30
31-40
41-50
51-60
61+
Age Range


Years Teaching Comparison: MassEd Subscribers vs. All Educators
Percent of Educator Population
40%
35%
30%
25%
20%
15%
10%
5%
<5
6 to10
11 to15
16 to 20
21 to 25
26 to 30
31 to 35
36 to 40
41 +
Years Teaching
All Educators
MassEd.Net Educators

Plan

Mass Community Network

The Mass Community Network's dedicated state-wide high-speed network will connect public schools, municipal offices, libraries, and communities. Aggregate demand will enable advanced services at a tremendous cost savings to the Commonwealth. For more information contact Tom Iacobucci [tiacobucci@doe.mass.edu].

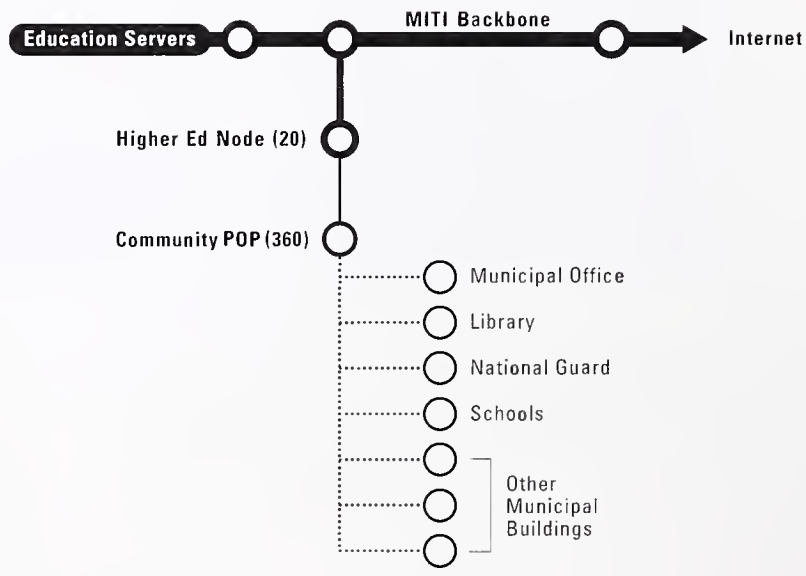
One of the Commonwealth's greatest technology assets, and one of its best-kept secrets, is buried underneath the Mass Turnpike. The asset is MITI, a super high capacity fiberoptic cable running the length of the turnpike.

The goal of the Mass Community Network is to use MITI to build out a state-wide dedicated network for schools, municipal buildings, libraries, and community centers. With such a network in place, the savings from not having to buy equivalent services on the open market could reach hundreds of millions of dollars over the next twenty years.

MCN is more than just a physical network, however. In fact, MCN is first and foremost a purchasing cooperative whose members include: the DOE, the Information Technology Department, the Administration and Finance Secretariat, the Board of Higher Education, the UMass President's Office, University Information Services, WGBH, the Boston Public Schools, the Massachusetts Municipal Association, and the Massachusetts Corporation for Educational Telecommunications. Together, this broad coalition seeks to aggregate demand for telecommunications services and drive down costs while taking advantage of the already built MITI backbone.

While still in the initial planning phase, the basic premise of the plan is to build out dedicated connections from existing higher education nodes to 360 community "POPs" (i.e. points of presence). Schools, libraries, and municipal buildings will then be able to purchase dedicated connections into the local "POPs" at comparable to wholesale rates.

Although it will take some time to connect all of the Commonwealth's communities together, once the network is established schools will be able to take advantage of a range of services previously unheard of in the K-12 universe. For example, interactive two-way video, virtual conferencing and virtual white boards, industrial strength proxy caching and other as-yet-undreamed services will be available for schools to explore. □



We have to do some SERIOUS LEARNING FROM OUR KIDS

-NICHOLAS NEGROPONTE

On-Line Curriculum

The Department of Education will use three distinct, but integrated initiatives to improve access to curriculum resources on-line. For more information contact Chris Hughes [chughes@doe.mass.edu].

The Department's on-line curriculum resource effort is comprised of three distinct, but integrated, initiatives. These initiatives are funded through the State appropriation for the Mass Community Network (MCN). They are part of a larger goal to put more content, of more value to educators, on the web and in the hands of educators.

The first initiative is called CLASP (Curriculum Library Alignment and Sharing Program) and is led by the Mass Networks Education Partnership, Inc. (Mass Networks), in collaboration with the North Andover School District, a fore-runner in the area of using databases to support curriculum alignment. CLASP's focus will be on enhancing and supporting the North Andover database application to help Districts compare and align their curriculum plans with the standards found in the Massachusetts Curriculum Frameworks. Mass Networks will extend the value of the application by creating regional forums where curriculum directors and planning committees can compare notes and learn from each other, as well as learn how to get the most from the database application. Its goal will be to help coalesce a growing movement towards sharing and co-developing curriculum plans, definitions, and standards.

The second initiative is a joint project between Mass Networks and the Department of Education (DOE). It will involve two things: an interface to the CLASP database geared to the Curriculum Framework writers, such that they will have a way to directly input the revised frameworks into a database; and consulting services to help the writers develop a common document structure, so that all the frameworks can be consistently ordered and numbered.

The third initiative is being led by the DOE. This initiative will focus on building an on-line web database of lesson plans that will enable teachers to download curricula that are directly tied to the Curriculum Frameworks according to user-defined criteria (filters). For example, a teacher might want to view lesson plans for tenth grade level history learning strand 1, Chronology and Cause, that were endorsed by the Bradley Commission on History in Schools. They would be able to specify these criteria when conducting a search of the database, by using a simple web form. In addition to searching for existing lesson plans, teachers, districts, and publishers will also be able to submit their own lesson plans into the database so we can build a showcase of the State's best work. In the future, a compensation function ("e-commerce") will be piloted to determine whether we can create a market economy for on-line curricula. Finally, the Department will be working with several vendors to supply curriculum materials such as source documents, interactive media, and streaming video with the lesson plans pertaining to them. This would create a "one-stop shop" for lesson plans and curriculum resources. □

To keep up, you need the right answers. TO GET AHEAD, YOU NEED THE RIGHT QUESTIONS.

-JOHN BROWNING AND SPENCER REISS

MEET Project

A description of the five year, $10,000,000, Federal grant to provide technology professional development to 85% of Massachusetts teachers. This system, consisting of teaching, support, and policy, will promote the use of on-line technology for teaching and learning. For more information contact Connie Louie [clouie@doe.mass.edu].

Project MEET will build on existing state initiatives to create a statewide collaborative of nationally recognized organizations to provide technology professional development to Massachusetts educators.

Massachusetts has committed itself to provide technical professional development to 85% of Massachusetts educators and enable 50% of those educators to become proficient in using technology as a tool to improve student learning consistent with the Massachusetts Curriculum Frameworks. Project MEET provides an essential step towards this goal through a three-tiered systemic approach: Teaching, Support, and Policy.

Teaching - training teams of teachers in the use of technology as a tool to strengthen their curriculum and raise the achievement of ALL students.

Support - developing the leadership, curriculum integration and planning skills of technology professional development (TPD) specialists, who will support teachers.

Policy - identifying policy issues raised by technology, and recommending and advocating for proposed solutions.

Project MEET's technology emphasis will be on the use of on-line technology for teaching and learning. Emphasis will be placed on an understanding and implementation of the Massachusetts Curriculum Frameworks. The inter-relations of disciplines will be underlined, and technology will be framed as an effective tool for interdisciplinary project-based learning. In order to be responsive to the needs of diverse learners, particular attention will be given to issues of universal design and assistive technology. Progress will be quantified and qualified in five research and development sites.

The design of this project requires that the teachers enrolled are not beginners. Instead, they have been users of technology themselves, and are ready to focus their attention on the curriculum applications of technology, rather than technology per se. This project views teacher proficiency under the following stages:

Stages of Technology Acquisition

Stage 1: Entry - Teachers begin to use basic applications for personal productivity and classroom presentations.

Stage 2: Initial Integration - Teachers are using a variety of applications and make technology available to students.

Stage 3: Integration - Teachers are using technology for communication and research, and integrate these uses into the content areas.

Stage 4: Invention and Innovation - Teachers use technology as a tool for implementing new strategies in their teaching of the content areas.

This project has been funded through the Technology Innovation Challenge Grant Program, under the U.S. Department of Education. It is a five-year project and the following table indicates the award periods:

	Date	Amount
Year 1	10/01/1998 — 09/30/1999	$1,999,878
Year 2	10/01/1999 — 09/30/2000	$2,000,000
Year 3	10/01/2000 — 09/30/2001	$2,000,000
Year 4	10/01/2001 — 09/30/2002	$2,000,000
Year 5	10/01/2002 — 09/30/2003	$2,000,000

Project MEET provides...a three-tiered systemic approach...Teaching, Support, and Policy.

Principal Investigators:

David Driscoll,
Commissioner
Massachusetts Department of Education

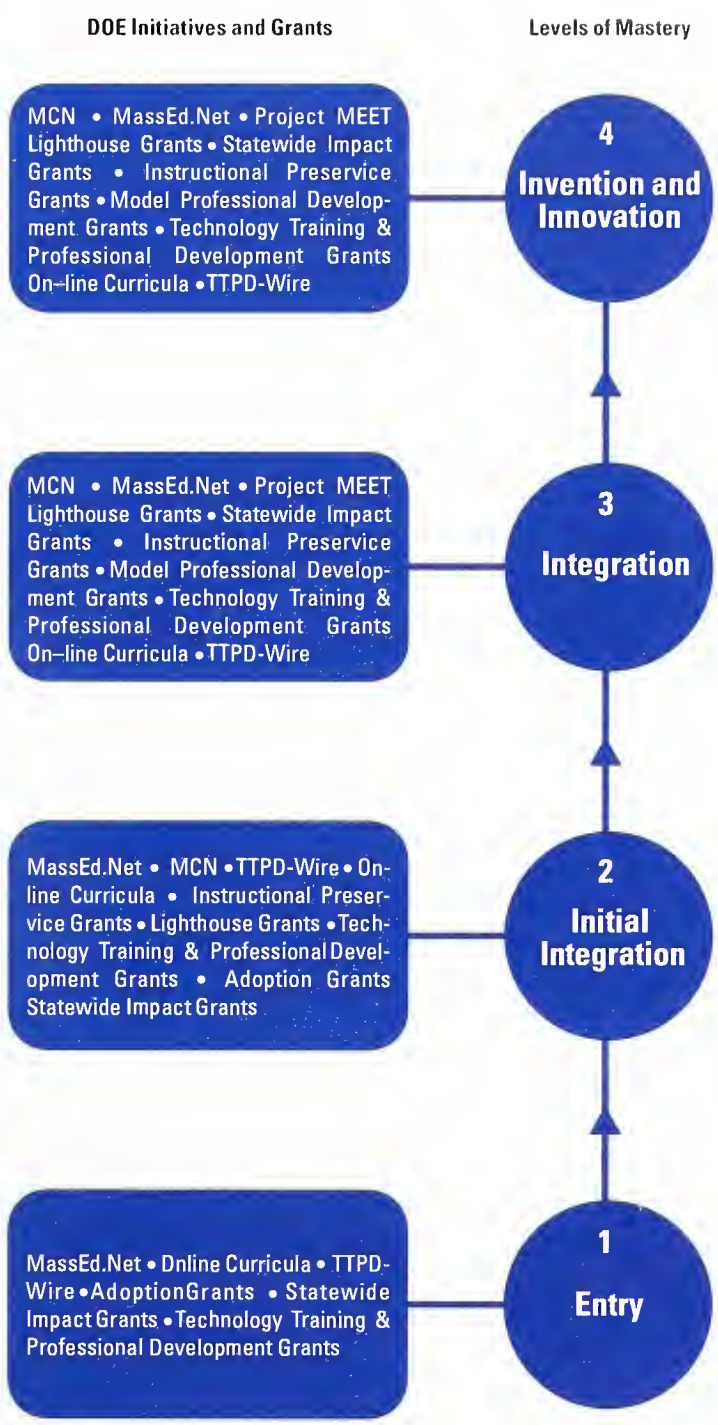
Peter Negroni,
Superintendent, Springfield Public Schools

Selma Botman,
Vice President for Academic Affairs, University of Massachusetts

Collaborative Partners:

Massachusetts Department of Education
WGBH
TERC
CAST, Inc
Institute for Community Inclusion
Mass Networks Education Partnership, Inc.
The Board of Higher Education
Chicopee Public Schools
Lowell Public Schools
Pittsfield Public Schools
Springfield Public Schools
New England Adolescent Research Institute
MassCUE □

DOE Professional Development Efforts:



PROGRAM

Youth Tech Entrepreneurs

Youth Tech Entrepreneurs (YTE) will create student technology leaders in Massachusetts public schools. High school students will maintain schools' computer systems, run technology workshops, and develop high-tech businesses. For more information, go to the YTE website at www.yte.org, or contact Michael Goldstein [mgoldstein@doe.mass.edu].

Imagine a school where high school students provide computer support for their teachers, build the computers that teachers use, even train the teachers how to use new technology. Imagine a school where students develop help-desk, Internet, and new media enterprises of such high quality that community members and even small businesses look to their neighborhood school for computer services. Now imagine a program such as this in every high school in Massachusetts.

How it will Work:

In the fall of 1998, eighteen sophomores at Malden High School began a three-year pilot program sponsored by the Massachusetts Department of Education. They will develop substantive skills in three areas:

Students as Technicians - Students will learn to repair and maintain computer systems. By the end of the first academic year, students will take the *A+ Certification Exam*, a rigorous and respected industry standard. In their second and third years, they will develop skills in computer networking, web development, graphic design, and application development.

Students as Teachers - Students will learn to teach others what they have learned. During their first year, students will run workshops in how to use computers more effectively at home and in the classroom.

Students as Entrepreneurs - Students will develop innovative projects that serve their communities. During their first year, students will organize a technology fair, make web sites for school clubs and local businesses, and build inexpensive computers for families.

YTE will be:

Inclusive - We believe that technology is a great equalizer of gender, class, and racial difference, and we actively recruit a diverse group of students. Our pilot class is evenly divided between young women and men.

Self-Sufficient - YTE programs will sustain themselves. They will save districts tens of thousands of dollars, attract industry partnerships, and generate income through student-run enterprises.

Networked - YTE will be a central hub of information for supporters of rigorous student-based technology programs. Through its newsletters, regional meetings, and conferences, YTE will keep education and business leaders informed and working together. □

I do not fear COMPUTERS
I FEAR THE LACK OF THEM.

-ISAAC ASIMOV

ETIS Summary

Educational Technology Integration Services (ETIS) allows public schools and libraries to procure technology goods and services in a cost-effective and streamlined manner. To date, Massachusetts schools have used ETIS to purchase over $15,000,000 worth of products and services. For more information contact Steve Newburg [snewburg@doe.mass.edu].

Educational Technology Integration Services (ETIS) was launched in May, 1997 as a means for public schools (and now public libraries) to easily procure technology goods and services. Before ETIS, public schools had only two technology procurement options—a separate competitive bid process conducted under M.G.L. c. 30B, and an existing statewide "blanket" contract. The separate bid process, frequently requiring six months to complete, was simply too cumbersome to meet the dynamic demands of an educational technology procurement. The statewide blanket contract was not developed specifically for the educational technology market, which sometimes requires a close relationship between vendor and consumer. ETIS offers a level of quality, simplicity, and savings that meets the unique procurement needs of public education.

A procurement through ETIS involves each of the six steps listed below. At the outset of Step 5, but before the project actually begins, the selected vendor is required to submit cost disclosure templates to the ETIS management team. The templates ensure all vendor pricing (hourly rates, sale price of hardware and software, etc.) is reasonable within the educational technology market. This rigorous analysis has saved school districts nearly $300,000 thus far—money that is often immediately reinvested in the district's technology procurement.

The ETIS-required vendor templates also calculate overhead costs on the project. This information is encapsulated in the Vendor Past Performance Summary (see Step 3 below). The summary, posted to the ETIS website, provides a quantitative measure of vendor efficiency and value. Also, the public posting of project overhead acts to apply consistent pressure on vendors to keep their rates at the height of competitiveness.

The accompanying graphs show the growing popularity of ETIS and the resulting decline in project overhead over time.

Districts have truly embraced ETIS. Over 12 new ETIS projects break ground each week and many teachers and administrators have contacted DOE to express their satisfaction with the program. Of course, the ETIS management team often receives feedback with suggestions and requests. This feedback resulted in the formation of ETIS II (April, 1998) and ETIS III (October, 1998).

ETIS II allowed manufacturers of computing hardware to become approved ETIS vendors. Since manufacturers occupy a much different place in the market than resellers, a separate ETIS list was needed.

Six Steps to ETIS Procurement

1. **Identify your needs**
2. **Go to the ETIS website, www.doe.mass.edu/etis, to consult the ETIS Approved Vendor List and determine if any of the vendors meet your needs**
3. **On the ETIS website, review the ETIS Vendor Past Performance Summary to help rank potential vendors**
4. **Negotiate with selected vendor(s)**
5. **Choose vendor(s) and embark on the project**
6. **Return to the ETIS website to complete a vendor evaluation upon completion of project**

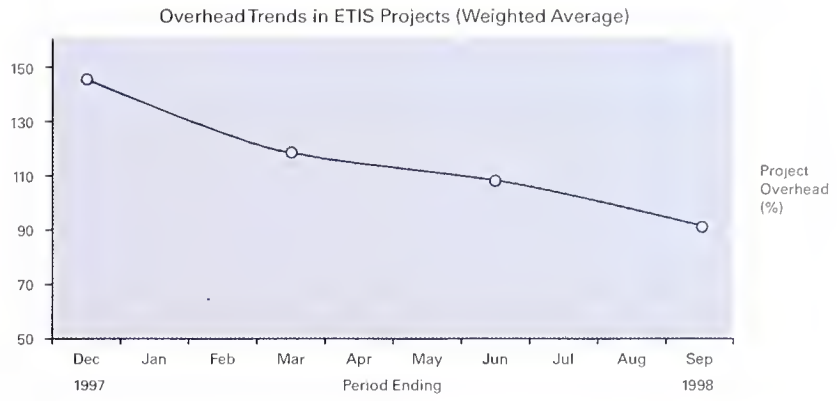
Some of the disclosure elements are not required of manufacturers, but other important conditions are necessary. Most importantly, all manufacturers approved under ETIS II have guaranteed that ETIS pricing is always the lowest available to any educational entity nationwide—regardless of configuration or quantity purchased. For example, a small school district, requiring just one computer, configured exactly to its specifications, automatically has the buying power of New York City. For the purchase of computers, ETIS has forged special alliances with Apple and Dell. For those with less specific needs Dell offers even greater discounts called "ETIS bundles." The bundles are usually updated once per month and are offered as "while supplies last." ETIS Bundles, as well as individually configured computers, are available for personal purchase by educators and administrators (as long as the products are shipped to the school in which they are employed).

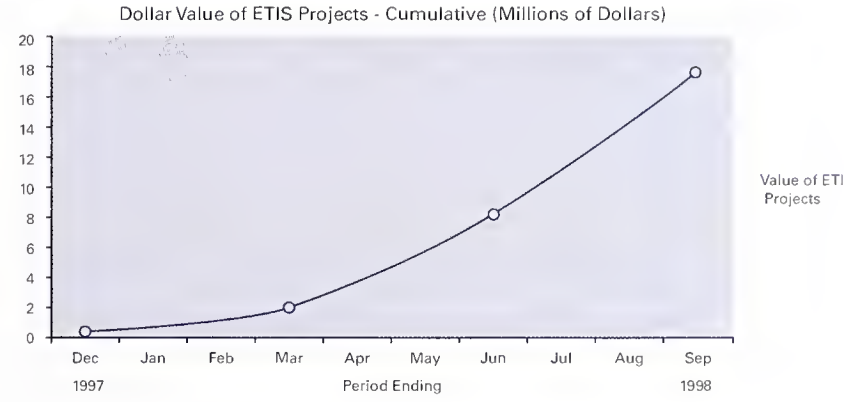
ETIS III establishes a separate approved vendor list for providers of on-line instructional content. ETIS III, which is just underway, will ultimately offer an impressive array of teaching tools far outside the realm of textbooks. Soon, teachers will be able to download interactive, up-to-date content that can be presented on its own or be integrated with lesson plans, tests, writing assignments, and field trips.

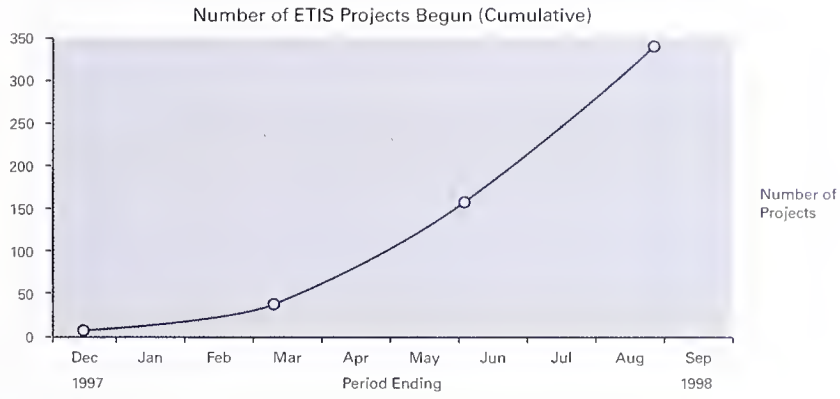
Another new phase of ETIS includes a partnership between the Department of Education and the State's Operational Services Division which will forge a powerful software buying partnership. Using the strength of OSDs agreement with a major software vendor, a great deal of software used in education, from the esoteric to the mainstream, will be available at unprecedented discounts.

For the most current information about all phases of ETIS, including approved vendor lists, consult the website - www.doe.mass.edu/etis □

ETIS makes buying technology easier, faster, and cheaper...







ETIS Vendor List

The CO/OP
Compucom formerly: CIC Systems
The Computer Merchant
ComputerLand
Data Systems Network Corp.
Garren/Shay Associates
GE Capital Info. Tech.
JCI Communications
LAN Tamers
Lincoln1.Com
Merrimack Education Center
Micro Warehouse
N.E. Computer Resources
Net Daemons Associates
NetTeks
New Media Artists
PC Build
Pinnacle Training
Retrofit
Systems Engineering, Inc.
Systems Supply, Inc.
Systems, Software, Support (3-SI)
Triumph Technologies
UNICOM - MicroAge
Whalley Computer Assoc.

Y2K Planning

Update

The Year 2000 "Millennium Bug" is a serious issue, but it can be addressed if users consider all of the issues and follow the suggested steps. For more information contact John Fuller [jfuller@doe.mass.edu].

Some people say that if you haven't started working on assessing the size and scope of your Year 2000 "Millennium Bug" problem, it's too late. Don't despair, however, because there are some things you can do right now, but don't delay too long, because time really is of the essence!

Because it is not a single problem, but actually a nest of different problems with myriad implications, there is no such thing as a "comprehensive Y2K solution." Its complexity can affect the system at the hardware, operating system or applications layer, and the resulting effects can be interrelated. A Y2K problem may require a different solution for each make or model of computer and for each database, application and protocol. Finally, a failure in any component of a system can cause the entire system to fail, and a failure of any system in a network can cause the entire network to fail. This is the "domino effect."

Some things to think about:

Check your software - Many software vendors were caught by surprise by the year 2000 problem and some will not be able to make their products ready. Others may make their products ready but may not be able to deliver the ready software until late 1999. Some vendors may no longer support a particular product that you may be running, and other vendors may have gone out of business. For date-sensitive systems, contact the vendors to find out their readiness plans. If a vendor will not give you information about the readiness status of a package, or if a ready version will not be available until late in 1999, you should investigate an alternate system or contact the Department of Education. To request any additional information, send e-mail to cto@doe.mass.edu, or call 877.512.8324 (K12-TECH).

Question your vendors - At the very least consider asking your vendors questions like the following:
Does *the system allow for entering dates? If yes, is the year 2 or 4 digits? What happens if you enter "00" or "01"?*
Will *the system operate differently depending on the day of the week? Will it operate differently at month-end, quarter-end, or year-end?*
Can *the system put things in order by date?*
Does *the system allow you to retrieve things by date?*
Can *the system perform date-based calculations?*

Check your hardware - Today, personal computers are widely used in schools. All personal computers have an internal clock that maintains and reports the date and time. In some computers, the year is stored and processed as two, rather than four, digits. The year 2000 will affect these computers just as it affects other systems. If you are running systems on your computers that access that PC's date, they may fail or produce bad results. All PCs should be tested, regardless of how they are used. Most major manufacturers of personal computers maintain a web site with Y2K information that can tell you which models are affected. Many of the fixes required are available directly from the vendor for free. If you find a problem with systems you have, contact a computer retailer to investigate purchasing a new Basic Input/Output System (BIOS) chip that is year 2000 ready, download software solutions from the Internet, or replace the non-ready PC with a model that is ready. Warning: Even a brand-new state-of-the-art PC may not be ready for the year 2000. Check with your vendor.

All PC's should be tested, regardless of how they are used...

Five simple steps you can take:

1. Awareness - educate and involve all levels of your school district in solving the problem.
2. Inventory - create a checklist of year 2000 readiness items.
3. Assessment - examine how severe and widespread the problem is in your District and what needs to be fixed.
4. Correction and Testing - implement the readiness strategy you have chosen and test the fix.
5. Implementation - move your repaired or replaced system back into circulation.

Other resources:

Here is a short list of some useful Web sites. Some of these are maintained by businesses who are trying to sell products.Listing them here in no way endorses their products.

http://www.magnet.state.ma.us/y2k/ - a link to the State's home page where you can find additional information

http://www.year2000.com - a good source of links to other sites

http://www.compinfo.co.uk/y2k/manufpos.htm - contains links to computer manufacturer's home pages where you can find Year 2000 compliance information

http://www.bog.frb.fed.us/y2k/ - The Year 2000 page of the Board of Governors of the Federal Reserve Bank □

Technology Literacy Challenge

Grant

The department is administering five federal grants and one state grant focusing on model professional development related to education technology. For more information contact Connie Louie [clouie@doe.mass.edu].

1. Technology Literacy Challenge Grant (Fund Code 606)

(I) Model Professional Development

The purpose of this component is to provide innovative technology professional development activities (workshop series, institutes, credit courses, etc.) to teacher leaders so that they will act as mentors in their districts in using technology to support the learning standards in the Curriculum Frameworks.

Ninety-Seven proposals were submitted. Each proposal was reviewed by three readers and thirty-five proposals were selected to be funded. The school districts that received the grants are listed below:

ACCEPT Education Collaborative
Amherst-Pelham School District
Athol-Royalston School District
Berlin-Boylston School District
Boston Sped Tech Center Schools
Cambridge School District
Danvers School District
Everett School District
Fitchburg School District
Frontier School District
Greenfield School District
Hamilton-Wenham Regional School District
Haverhill School District
Lowell School District
Marshfield School District
Martha's Vineyard School District
Maynard School District
Melrose Public School
Milton School District
Mohawk Trail School District
Needham School District
Pittsfield School District
Revere School District
Sandwich School District
Shawsheen Valley Voc Tech
Somerville Public Schools
Springfield Public Schools
Sutton Public Schools
Walpole Public Schools
Wayland Public School
West Springfield District
Westfield Public Schools
Williamsburg Public Schools
Wilmington Public Schools
Worcester Public Schools

Over $21M will be directed toward improving professional development in technology...

(II) Lighthouse Sites

The purpose of this component is to identify, enhance, and disseminate existing classroom projects that incorporate new technologies with the learning standards of the state curriculum frameworks in a way that is innovative and motivates students to learn. These projects, having already proven their effectiveness in the classroom, will serve as models, and the classroom teachers as mentors, for other classrooms in the school, other schools within the districts, or other districts across the state. These practices, together with other strategies, will facilitate systemic change in school districts to meet the goals of Education Reform.

173 proposals were submitted and 74 lighthouse technology sites were selected. The 1998-1999 lighthouse technology sites are:

Andover	Bancroft Elementary School
Arlington	Ottoson Middle School
Berlin-Boylston	Tahanto Regional High Schl
Boston	Boston Latin School
Boston	Oliver Wendell Holmes El
Brookline	Brookline High School
Cambridge	Kennedy School
Cambridge	Kennedy and Haggerty Schls
Cambridge	Cambridge Public Schools
Erving	Erving Elementary School
Erving	Erving Elementary School
Fall River	Morton Middle School
Fall River	Durfee High School
Falmouth	East Falmouth Elementary
Franklin	Davis Thayer School
Franklin	Remington/Jefferson School
Franklin	Horace Mann Middle School
Frontier	Frontier Regional/Union 38
Regional	K-12 Social Studies
HampdenWilbraham	Minnechaug Regional HS
Hanover	Cedar Elementary School
Haverhill	Nettle-St. James Middle Schl
Holliston	Holliston High School
Holliston	Holliston Middle School
Holliston	Holliston Elementary School
Hudson	Hudson High School
Ipswich	Ipswich High School
Ipswich	Whipple Middle School
Ipswich	Winthrop Elementary School
King Philip	King Philip Regional High School
Lexington	Clarke Middle School
Lexington	Lexington High School
Masconomet	Masconomet Regional HS
Maynard	Fowler Middle School
Minuteman VoTech	Minuteman Science&Tech HS
Needham	Media Resource Center, Newman School
New Bedford	Keith Jr. High School
New Bedford	Sgt. William H. Carney Acad
New Bedford	New Bedford High School
New Salem-Wendell	Swift River School
Newburyport	Newburyport High School
Northbridge	Northbridge Primary School
Northbridge	W. E. Balmer School
Pelham	Pelham School
Quincy	Atlantic Middle School
Quincy	Sterling Middle School
Revere	Garfield School
Shawsheen Valley	Shawsheen Valley RVT VoTech
Shutesbury	Shutesbury Elementary School
Somerville	West Somerville Neighborhood
Somerville	East Somerville Community Schl
Somerville	Somerville High School
Sturbridge	Burgess Elementary School
Sutton	Sutton Elementary School
Wakefield	Wakefield Memorial HS
Walpole	Johnson Middle School
Walpole	Old Post Road School
Walpole	Bird Middle School
Ware	Ware High School
Wareham	Wareham High School
Wareham	Wareham High School
Wayland	Wayland Middle School
Wellesley	Hunnewell School
Wellesley	Hunnewell School
Westford	Robinson School
Westford	Abbot School
Westford	Westford Academy
Williamsburg	Williamsburg Elementary Schl
Williamsburg	Williamsburg Elementary Schl
Worcester	Accelerated Learning Lab (A.L.L.)
Worcester	Granite Street School
Worcester	E.J. McGrath School

Massachusetts Technology Funding 1998-1999 Federal and State Support

	Fund Code	Grants	Projects	Total Funds
Federal Technology Funding				
	Fund Code 606	Model Professional Development Grants	35 Model Professional Development Projects	$1,597,959
	Fund Code 606	Lighthouse Technology Grants	74 Lighthouse Sites	$1,987,387
	Fund Code 607	State Impact Grants	9 Statewide Projects	$2,399,387
	Fund Code 608	Instructional Technology Preservice Grants	9 Preservice Grants	$346,714
	Fund Code 612	Adopting Best Technology Practices	Funding up to $40,000 Per Project	$600,000
State Technology Funding				
	Fund Code 609	Technical Training and Professional Development	District Determined	$15,000,000

2. Technology Literacy Challenge Grant 2 (Fund Code: 607)

The purpose of the Year 2 Statewide Impact Grants is to continue to provide seed funding for school district or collaborative-led partnerships to foster statewide impact in the use of technology to support teaching and learning. Nine school districts will continue to work with consortium partners to implement their projects, and they are:

Acton-Boxboro Regional School District:
Technology Fluency

Boston Public Schools: Tech Boston

Brockton Public Schools: CyberWorks

Douglas Public Schools: Learning Network

Hudson Public Schools:
Science&Math Inquiry Portable Accessible Computer

Natick Public Schools:
Assistive Technology for the Improvement of Learning

Southeastern Regional School District: TechNet

Springfield Public Schools:
Leadership Program–Technology&Curriculum Integration

Watertown Public Schools:
Information Technology/ Telecommunication Pathway

3. Technology Literacy Challenge Grant 3 (Fund Code: 608)

The purpose of the Instructional Technology Preservice Grants is to integrate the use of instructional technology into teacher preparation programs. It is important that all new teachers learn how to use new technologies (such as the Internet, multimedia, CD-ROM) in their classrooms to create effective approaches to teaching and learning. School districts in partnership with colleges/universities will work together to accomplish this important aspect of teacher preparation.

The Department received 12 proposals for this program and 9 projects were selected to be funded. Funded school district and higher education partnerships are:

Beverly:	Endicott & Salem State Colleges
Georgetown:	Gordon College
Newton:	Boston College
Ipswich:	Salem State College
Frontier Regional:	UMass Amherst
Hampden-Wilbraham:	Springfield College
Sutton:	Worcester State College
Worcester:	Clark University
Concord:	Boston University

4. Adopting Best Technology Practices (Fund Code 612)

The purpose of this grant program is to provide seed funding to adopt best classroom practices or professional development models that integrate technology into the local curriculum and align with the state Curriculum Frameworks. Examples of best practices are the Department of Education-awarded Technology Lighthouse Sites, Model Professional Development Sites or other exemplary models. In addition priority will be given to projects that are from school districts that have a greater percentage of disadvantaged students than the state average.

Approximately $600,000 will be awarded for this program and up to 15 projects will be funded. Each grant award is up to $40,000.

For more information, see:
www.doe.mass.edu/doedocs/grants/fy99rfp/fy99cgp.html#11□

Milken Report Study

The following press release summarizes a study, Technology Counts '98, funded by the Milken Family Foundation, that links computer use to higher student test scores.

WASHINGTON - September 29, 1998 - An unprecedented study released today by *Education Week* links computer use to higher student test scores. The key is how students use the computers - not how often, the analysis shows.

With billions of dollars being spent each year on education technology, policymakers and the public are demanding to know: Is it effective?

The answer is yes – under the right circumstances. The study links computers to higher student scores on a national standardized test, but only if the technology is placed in the hands of trained teachers who use it in the most productive ways. Used in other ways, computers appear to have a neutral or negative effect on scores.

The study, conducted by the Educational Testing Service (ETS), is part of *Education Week*'s second special report on education technology in the nation's schools, *Technology Counts '98: Putting School Technology to the Test*. The annual project is sponsored by the Milken Exchange on Education Technology, an independent, nonprofit initiative of the California-based Milken Family Foundation.

Technology Counts '98 also includes a survey of the 50 states' policies on education technology. Most states are appropriating money for technology each year. But far fewer are addressing inequities between low- and high-technology schools, requiring students to meet technology standards, or demanding that teachers demonstrate they can use technology in the classroom.

"Many states are not preparing and supporting teachers in a way that new research says leads to higher student achievement," said Virginia B. Edwards, the editor and publisher of *Education Week*, American education's newspaper of record.

"There's a big difference between having technology and using it effectively," said Cheryl Lemke, the executive director of the Milken Exchange on Education Technology. "Without policy changes focused on increasing effectiveness, technology risks becoming another lost educational opportunity."

Studying "The Nation's Report Card"

At the request of *Education Week*, ETS Associate Research Scientist Harold Wenglinsky analyzed 4th and 8th grade mathematics scores from the 1996 National Assessment of Educational Progress (NAEP), the federally sponsored exam known as "the nation's report card." In addition to students' scores, the NAEP data include teachers' responses to questions about technology use, teacher training and school climate.

After controlling for the influence of other factors that affect achievement, such as students' socioeconomic status, class size, and teacher qualifications, Wenglinsky found links among certain kinds of technology use, higher student achievement, and better school climate. School climate includes teacher and student attendance, tardiness, and morale. His research is the first to document these relationships on a standardized test given to a nationally representative sample of students. Until now, most studies on computer use were restricted to observations in a much smaller number of classrooms.

There's a big difference between having technology and using it effectively...

"Technology can have positive benefits," Wenglinsky said. "But those benefits depend on how the technology is used." Wenglinsky's full-length study titled "Does It Compute: The Relations Between Educational Technology and Student Achievement" is available from ETS.

Among the findings:

Higher-Order Thinking - Eighth graders whose teachers used computers mostly for "simulations and applications" - generally associated with higher-order thinking - performed better on NAEP than students whose teachers did not. A simulation can illustrate relationships and allow students to test the effects of changing variables. An application such as a spreadsheet program lets students manipulate and analyze data. Eighth graders whose teachers used computers primarily for "drill and practice" (generally associated with lower-order thinking) performed nearly half a grade level worse. *Technology Counts '98* includes state-by-state data describing these kinds of computer uses.

Learning Games - Among 4th graders, students whose teachers used computers mainly for "math/learning games" scored higher than students whose teachers did not. These students scored up to 15 percent of a grade level higher than other students. The research found no association, positive or negative, between 4th graders' scores and simulations and applications or drill-and-practice. *Technology Counts '98* includes state-by-state data describing this kind of computer use.

Teaching the Teachers - In both grades, students whose teachers had professional development in computers outperformed students whose teachers did not. Similarly, where teachers had professional development with computers and used them for higher-order skills, schools tended to enjoy higher staff morale and lower absenteeism rates. In addition, 8th graders whose teachers had had technology training performed more than a third of a grade level better than those with teachers who lacked such training. The training also was linked to gains at the 4th grade level, although the effect was indirect and the difference in scores was much smaller. *Technology Counts '98* includes state-by-state data describing teacher training.

Time on Task - Students who spent more time on computers in school did not score any higher on the 1996 NAEP in math; in fact, they performed slightly worse. *Technology Counts '98* includes state-by-state data describing class time devoted to computer use.

Achievement Gap - Low-income and black students are less likely than their peers to have teachers who use technology to its full advantage, the study found. In 8th grade, about 31 percent of white students used computers mostly for simulation and applications, compared with just 14 percent of black students. At the same time, more than half of America's black students had teachers who used computers mostly for drill-and-practice compared with only 30 percent of white students.

School Climate - The same factors that were tied to better achievement also appeared to be linked to an improved school climate. Where teachers had professional development with computers and used them for teaching higher-order skills, schools tended to enjoy higher staff morale and lower absenteeism.

The View from the States

Technology Counts '98 also presents nine policy recommendations that states should follow in their efforts to use technology most effectively. State activities in each area, including funding, equity, standards, and teacher preparation, are examined.

"We hope this information will help state policymakers see how their states stack up against those in the rest of the country and then to spur them to make smart decisions about using technology in schools," Edwards said.

Among the findings:

Spending - All but eight states provided funds for education technology in fiscal 1998. State spending ranged from $500,000 in Vermont to $230 million in California, for a total of $1.7 billion.

Access - The amount of hardware is rapidly increasing in schools. Three of every four U.S. public school classrooms have at least one computer designated for instructional use. Across the nation, the number of students per instructional multimedia computer dropped by a third over the past year, from 21 students per computer to 13 students per computer. Arizona, Arkansas, Louisiana, South Carolina, and West Virginia made the biggest reductions. More than four of every 10 classrooms are connected to the Internet.

Equity - Across the nation and in many states, high-poverty schools are less likely than other schools to have Internet access. Only 22 states target technology funds to particular disadvantaged school districts. Of those 22, only eight states target funds on the basis of technology availability. Others distribute funds on the basis of wealth, under the assumption that poorer schools and districts have less money to spend on technology.

Technology Standards - Thirty-eight states have standards or graduation requirements pertaining to technology. Some states focus on the technology skills students should acquire, while others emphasize the history of technology or its role in society. West Virginia requires that kindergarten students should know how to use a mouse and hit the "return" button on a keyboard. Colorado's science standards ask students of all ages to "know and understand interrelationships among science, technology, and human activity, and how they can affect the world." In North Carolina, beginning with the Class of 2001, high school seniors will have to pass an assessment of technology competency before graduating.

Teacher Preparation - Thirty-eight states have technology requirements either for teaching candidates or for teacher preparation programs, but the requirements vary widely in rigor. In Massachusetts, schools of education are required only to help prospective teachers learn to use "new technologies"; in Idaho, education schools assess whether candidates are proficient in technology.

Professional Development and Support - More than eight out of 10 (81 percent) of the nation's 4th graders and over three-quarters (76 percent) of 8th graders had math teachers who had received any amount of professional development in technology within the past five years, according to the 1996 NAEP survey. Almost all states offer teachers opportunities for professional development in technology, but only Connecticut, New Hampshire and North Carolina require teachers to participate in training in technology as a condition for renewing their license. Fourteen states require districts to spend a certain percentage of technology funds on professional development. Nonetheless, teachers are less likely to have had training in advanced technologies. In 1997, 40 percent of teachers reported having had no formal training in using the Internet. While nearly three in 10 schools have a full-time technology coordinator, poorer schools are less likely to have such support for technology, the report says.

Effective Use of Technology - How teachers use computers in math and science varies by grade level and by subject, the report says. Eighth graders are most likely to have math teachers who use computers primarily for "drill and practice," even though this use was linked to lower test scores on the 1996 NAEP. The majority of 4th graders have teachers who use computers primarily for math/learning games. Among 8th graders, nearly half had math teachers and science teachers who used computers for instruction in 1996. And three-quarters of 4th graders had teachers who used computers in math instruction that year. The report says that two-thirds of teachers spend two hours or less per week using the Internet for instruction. Teachers are far more likely to use the Internet as a source of information than as a tool for communications.

Technology as a Tool for Education Reform

Technology Counts '98 also presents 10 case studies of schools and programs that are using technology to foster goals of the education reform movement. Each case study includes highlights of the relevant research, recommendations for using technology most effectively, and a list of additional resources. The reform goals highlighted are:

Teaching the basics
Teaching students to think
Preparing students for a digital world
Making learning "authentic"
Changing the way teachers teach
Building a better teaching force
Forging the home-school connection
Turning students on to school
Making the most of assessments
Opening up the classroom

Education Week and its sister publication, Teacher Magazine, are owned and operated by Editorial Projects in Education, a Washington-based nonprofit organization. For more information, visit the publications' web site is at www.edweek.org.

Copies of *Technology Counts '98* are available for $6 from *Education Week* by calling (800) 346-1834.

Founded in 1997, the Milken Exchange on Education Technology is a nerve center of an emerging national network of educators, public officials and business leaders concerned with the effective and responsible use of technology in America's classrooms. The nonprofit organization provides independent, nonpartisan analysis and research, and a forum for debate of cutting-edge learning technology issues. For more information, visit the Milken Exchange website at www.mff.org, or call Michael Reese at (310) 998-2878.

The Educational Testing Service is the world's largest private educational measurement institution and a leader in educational research. The nonprofit organization develops and administers achievement, occupational, and admission tests, such as the SAT for the College Board, for clients in education, government, and business. ETS annually administers more than 9 million tests in the United States and 180 other countries. For more information, visit the ETS website at www.ets.org, or call Ed Tate at (609) 734-1616. Copies of "Does It Compute" are available for $9.50 from ETS by calling (609) 734-5694. The report can also be downloaded from ETS's website at www.ets.org/research/pic.

For more information on *Technology Counts '98*, please contact Joseph Garcia or Matthew Maurer at (202) 467-8344. □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